



inpaws journal

Indiana Native Plant and Wildflower Society

Spring 2014

Nativars: Friend or Foe?

By Michael A. Homoya

There has been considerable interest of late regarding the use (or misuse) of "nativars" in landscaping, natural community restoration, and utility, e.g., erosion control. A nativar is a cultivar of a native plant, hence the title "nativar." A



Birdshirebotanical.org

In a designed landscape, the nativar Rhus aromatica 'Gro-Low' provides a band of orange and red foliage during the fall. Gro-Low is a fragrant cultivar of a native sumac. It is not a good idea, however, to plant nativars where

they may cross with local native populations.

nativar is typically developed from a wild native plant or group of plants manifesting a particular desirable trait(s) e.g., growth habit, size, color, etc., that is then cloned or otherwise selectively bred and propagated. Some may also consider a plant a nativar if it's the product of hybridization between two different native species. This is stretching the definition a bit, especially if the hybridization event could not have occurred naturally in the wild.

Most of the native plants available in the retail nursery trade are nativars. You may know, and possibly even grow, ninebark with purple leaves, or Virginia sweetspire with brilliantly colored fall foliage, or perhaps a low-growing fragrant

sumac. These have all been selected for particular traits that we find desirable, and are well known nativars of *Physocarpus opulifolius*, *Itea virginica*, and *Rhus aromatica*, respectively.

Some people avoid growing nativars, but why? After all, a native plant with desirable landscaping traits is a good thing, right? In some cases yes, but desire may also have a dark side. Before delving into this issue further, let me state that I'm addressing the use of nativars in home landscaping, not for natural

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community restoration. Regarding the latter, I'm a strong opponent of utilizing nativars or non-local genetic stock in such projects, but instead advocate using a diversity of local genotypes, originating from as close to the restoration site as possible. There are certainly consequences if the latter is not done (see link in paragraph 5 below). For home landscaping I have less of a concern about using nativars or non-local plants of a given native species, but as we shall see there are considerations to take into account when using them.

It is likely that a particular nativar for purchase originated from an area some distance away from where you wish to grow it. Since a species typically exhibits genetic and morphological differences across its natural range, a nativar that's been developed from it may exhibit traits

Friend or Foe? – continued on page 6

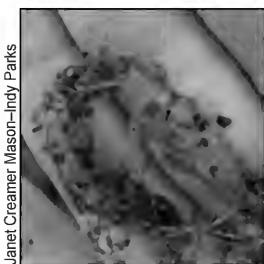
Colorful

By Barbara Plampin

I predict that early this June, I'll be knee-deep in gold. The gold is thousands of orchid-like flowers magically rising from a firm-bottomed, clear-water pond near my house in what is normally a nearly dry marsh of almost solid blue joint grass (*Calamagrostis canadensis*).



Janet Creamer Mason-Indy Parks



Janet Creamer Mason-Indy Parks



Museum of Science Boston

Cause of this magic? Our extra-heavy 2014 snows, now melted and imprisoned by the underlying clay soil until the moisture evaporates in late summer, and the reproductive mechanism of the "orchids," the great or common bladderwort (*Utricularia macrorhiza*, a.k.a. *U. vulgaris* in the Lentibulariaceae). Usual habitat: less firm-bottomed marshes and fens and mucky, black-watered swamps and bogs. I feel very fortunate to enjoy "my" gold so pleasantly.

With a pouch (palate) on its lower lip and a spur, a 4/5-inch great bladderwort flower does suggest an orchid, but an orchid flower doesn't combine these features. The flower has an upper lip. Six to 20 flowers clothe a thick stem rising to 10 inches above the water. Some think the flowers resemble snapdragons, an apt comparison.

The plants are rootless. Supporting the flowers below the water are floating masses of

forked thread-like leaves, dense and plumy, and numerous tiny sack-like bladders functioning as suction traps. Prey include paramecia. Once, through my microscope, I saw what looked like a tiny pink shrimp (a copepod?) half in, half out of a bladder.

When a friend said she'd seen a TV show claiming that one could hear great bladderwort traps snap shut, we dashed to the marsh and scooped up hanks of submerged plants. Standing each on her own hummock, we held leaves and traps to our ears and listened and listened. Not a peep.

Great bladderwort functions somewhat like a resurrection plant (*Selaginella lepidophylla*). The ends of the leaf-bearing stolons roll themselves into tight balls called turions. When the remainder of the submerged plant dries up, the turions fall to the floor of the marsh. They remain dormant until the right conditions enable them to develop new plants.

How long is dormancy? The usual habitat has enough water for plants to emerge most years. I suggest very long-term dormancy for plants in blue joint marshes. Botanists recorded flora in a blue joint marsh in Dune Acres, Porter County, for decades without spotting great bladderwort there. Most likely, turions arrived on wildfowl feet, as they probably did in a man-made goose pond south of US 20 in that county, where great bladderwort now flourishes. A further guess is that turions may simply remain dormant for three or more years.

At any rate, when the great bladderwort goes dormant this summer, I should be able to find several patches of normal-sized, state-rare intermediate bladderwort (*Drosera intermedia*), another carnivore which last year dwindled to one plant with pinhead-sized leaves.

Can you have your own sea of gold? In his excellent *Carnivorous Plants of the United States and Canada* (second edition, Timber Press, 2002), Donald E. Schnell gives directions for cultivation both indoors and out. Schnell points out that great bladderwort traps enough mosquitoes to affect human comfort. However, a friend and I unsuccessfully Googled for a supplier of plants. (Some places sell a pesticide that does in bladderworts!)

Paint me purple? Indiana has 10 of the 214 or so of the planet's bladderwort species. Of the

Predictions

nine Duneland species, my favorite is the elusive, state-rare purple bladderwort (*U. purpurea*) which in a nearby lake, sends up only two or three flowers most years. However, on July 4, 1976, an artist (Seurat, perhaps) painting this lake would have had to paint a river of purple zig-zagging through the lake, so profuse were the blossoms. Let's hope the heavy 2014 snow melt repeats this aesthetic treat.

Barbara Plampin is a field botanist and a life director of the Shirley Heinze Land Trust. She lives in the Indiana Dunes.

wikimedia



Botonywisc.edu



On these two pages, clockwise from above: blue joint grass (*Calamagrostis canadensis*); spoonleaf sundew (*Drosera intermedia*); a bladder magnified by a factor of 100; leaves and stems of bladderwort; and common bladderwort (*Utricularia macrorhiza*) blooming at Southeastway Park in Indianapolis.

One person's weed is another person's flower

Be cautious of pesticides or herbicides which may kill native water plants. Aquacide Products sells a pesticide that kills great bladderworts, among other species. See www.killlakeweeds.com/pages/bladderwort. To grow great bladderwort (*Utricularia vulgaris*), it is important to obtain local genotypes. The best way to ensure this is to find someone in your area who will share theirs or to rescue plants from a local area slated for destruction.

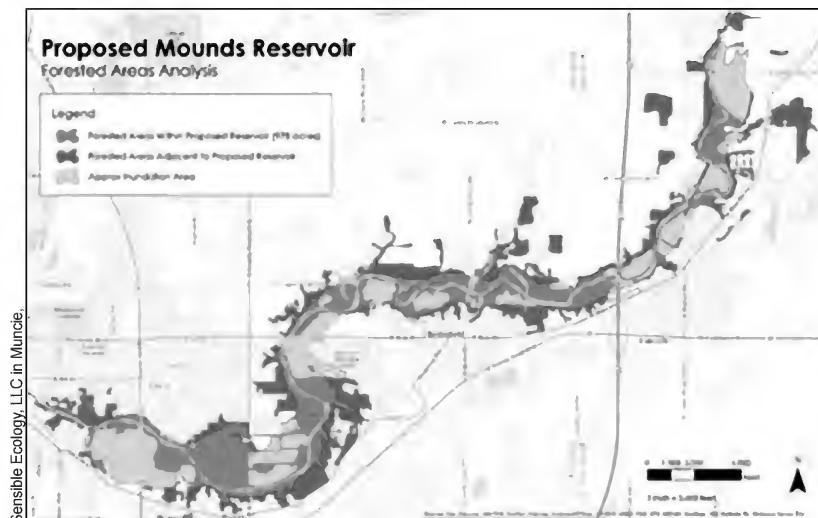
One supplier of great bladderwort turions (dormant buds) turns out to be in the Czech Republic. Although it claims to follow US legal requirements, it certainly can't provide genotypes local to any part of Indiana, nor can US suppliers outside the state. A quick internet search turned up no suppliers in Indiana. If you do find a supplier in the state, be sure to ask where the plant material originated.

Dam Poor Idea

By Lee Casebere

"To build a road is so much simpler than to think of what the country really needs."

— Aldo Leopold, *A Sand County Almanac* (1949)



A map of the proposed Mounds Lake Reservoir shows the 978 acres of forested land to be flooded in red.

Lee Casebere stands beside a huge burr oak in the White River floodplain at Mounds State Park.

It should be of concern to INPAWS members that there is a proposal to build a dam on the White River that would flood parts of Anderson and over seven miles of riparian habitat in Madison and Delaware counties. The reservoir is being couched as a stimulus for economic development in a city that has fallen on hard times.

Anderson was once a bustling factory town catering to the automotive industry, but today those jobs have gone to Mexico and Asia. In addition to economic development, the reservoir is also being billed as a potential water source for the Indianapolis area.

The reservoir would flood over one-third of Mounds State Park, a site of significant natural and cultural resources. The primary purpose of Mounds State Park is that it preserves the best examples in Indiana of mounds built by the prehistoric Adena-Hopewell culture.

Remarkably, the park also contains a significant series of groundwater-fed natural communities including graminoid (grass-related) and forested fens of state-wide significance. Also present are high-quality examples of mesic

and dry-mesic upland forests with mature and old-growth trees of impressive size.

A dedicated nature preserve is intended to protect at least parts of these significant communities, but the entire nature preserve would be destroyed by the proposed reservoir.

Fens are among Indiana's rarest natural communities, and their existence is a product of our glacial past. They nearly always occur near deep, extensive deposits of sand and gravel laid down as the glaciers retreated. Where these highly permeable deposits are underlain by less permeable soils such as clay, groundwater seeping downward reaches the less permeable layers, where it then flows parallel to the ground, and eventually surfaces as seepage and springs in places where drops in elevation expose the water at the surface. At such locations, specialized plant communities develop in the soggy, springy ground. Numerous rare plants and animals live in these special places, many of them habitat-restricted species.

As this reservoir drama unfolds, claims will surface that natural resources lost through flooding will be "mitigated" by replacing them elsewhere through habitat restoration. One of the great fallacies of our day is the lie that re-creating habitats through mitigation is somehow an equal and satisfactory substitute for destroying significant natural communities.

In this case, how do you replace, on a landscape scale, a glacially-created, groundwater-fed, complex system whose parts are not fully known or understood? It can't be done. How then, can one begin to fairly mitigate, and fairly compensate, such a significant loss?

INPAWS hopes to host a program (or piggy-back with another organization) sometime this spring to more fully inform interested folks about the proposed dam. Watch for announcements on the INPAWS blog or in your e-mail.

A group called the Heart of the River Coalition has formed to fight this proposal. For more information, visit their website at: www.moundslakereservoir.org.

Lee Casebere recently retired as assistant director of the Indiana Department of Natural Resources Division of Nature Preserves. He is vice-president of the INPAWS Central Chapter.

INPAWS' stance on reservoir

By Tom Hohman

On February 11, the INPAWS Council passed a resolution that states:

The proposed Mounds Reservoir, on the White River at Anderson, would inundate a rare and unique dedicated state nature preserve, as well as significant areas of mature riparian habitat. The Indiana Native Plant and Wildflower Society believes that this would represent irreparable damage to the flora and fauna of Indiana, and is opposed to the project.

The INPAWS position was based in part on the specific damage that this reservoir would do, which would be significant. However, it is also believed that this project would undermine the state nature preserve law, which has not faced such a challenge since its passage in 1967.

State law provides that a state-dedicated nature preserve may not be disposed of or used for other purposes unless there is determined to be an "imperative and unavoidable public necessity." If economic development is determined to provide that necessity, then no nature preserve in the state would be truly safe.

Tom Hohman is a retired civil engineer who worked for DNR for 39 years. An INPAWS past president, he is currently team leader for the 2014 conference and head of Central Chapter's Invasives SWAT Team.



Lee Casebere

Left: A spring runs through a skunk cabbage seep in a forested fen at Mounds State Park. One-third of the park would be flooded by the proposed dam.

April 26

Hendricks Gardeners to Host Show

The annual Hendricks County Master Gardeners "Gardening for All Ages" show will be April 26 from 9 a.m. to 4 p.m. at Hendricks County 4-H Fairgrounds, Danville. The free event offers exhibits, speakers, and free trees for the first 800 visitors.

Presentations will discuss food preservation, soil improvement, attracting pollinators, and more. A "Garden Wizard" will answer questions. A children's booth will have games and demonstrations, and youngsters can plant a seed to take home in a pot they decorate. Those interested in becoming a Master Gardener can learn about it at the Master Gardeners booth.

More than 40 exhibitors will offer plants, garden décor, bird-watching supplies, lawn care items and more. Popular booths last year featured "fairy gardens," bluebird houses, rain barrels and Indiana honey. Meal service will be available, and the tradition of offering free seed packets continues. For more information, visit www.hendricksgardeners.com.

Friend or Foe?

continued from page 1

different from those of your area, and may "behave" differently. It might cause large-scale problems in the local landscape, including invasiveness. On the flip side, it may not prosper. And since all individuals of a nativar are typically of one genetic makeup, if one is invasive, or is susceptible to a particular pathogen or pest, such will be the case for all.

One of the more serious problems of growing nativars is the introduction of foreign genes from the nativar into the local population of the same species. This is the result of cross-fertilization between the two and can result in genetic "pollution" of the local species. This is particularly an issue with wind-pollinated species, but with insect-pollinated species as well (many pollinators can fly!). The results from such gene mixing range from poor adaptation of progeny to the local environment to inability of the population to respond to environmental change. (http://nrs.ucop.edu/research/guidelines/non_native_genotypes.htm)

All said, does this mean that we should avoid nativars? Not necessarily. What often matters is placement and context. In a landscape setting – and one that is typically far removed from natural areas – there is less likelihood of gene flow occurring between nativar and locally wild populations. I have a Virginia sweetspire 'Henry's Garnet' in my back yard (central Indiana). Since Virginia sweetspire is naturally very rare and restricted in Indiana (found in just 3 far southern counties), the chance of gene exchange between my plant and those growing in the wild is virtually nil. On the other hand, growing it near the Patoka River might pose the risk of cross-fertilization since naturally occurring Virginia sweetspire grows there.

Will insects and other herbivores feed on nativars? It is possible that a particular nativar may not be palatable to local wildlife, especially insects. There is documentation to support such for some species (most have not been tested), but consider this: the vast majority of insect species and other invertebrates is found only in the context of natural areas, and rarely if ever ventures from them. In comparison, the diversity

of insects in our backyards is comparatively low. Certainly this is due in part to the dominance of exotic plants, but mostly it's because of the significant alteration of the character and complexity of the natural landscape in which we live. Thus, will it make much difference whether the native plants with which we landscape are of the local genotype, or a nativar of that species, when our landscape won't harbor most of the fauna that might feed on either of them anyway? Yes, to a degree it will make a difference, and I understand and appreciate that every bit we do to help our native flora and fauna is worthy of our effort. But in the big scheme of things, I believe our **foremost** focus should be on protecting and managing our remaining remnant natural areas. It is abundantly clear that the latter offers the greatest hope in saving the full slate of biodiversity in our state.

Here are a few recommended guidelines to follow for use of nativars. They are by no means complete.

1. To prevent possible genetic contamination, avoid planting nativars in proximity to wild populations of the same species. This is possibly the most significant reason not to use nativars.

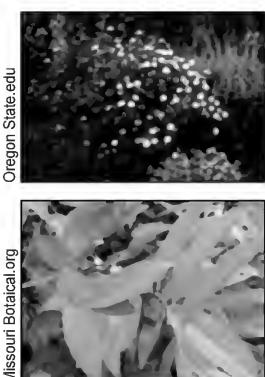
2. If proven to be sterile, a nativar may be acceptable for use near areas where wild populations occur. While the downside of sterile plants is possible lack of nectar, pollen, etc., and loss of seed production, it is the safest approach to avoid genetic contamination.

3. Avoid nativars sold as insect- and disease-resistant. These are less likely to support herbivores which in turn support animals higher up on the food chain.

Here are a couple of links to articles with different positions on the use of nativars.

www.wildones.org/wp-content/uploads/2011/12/Nativars-Statement.pdf
<http://gardeninacity.wordpress.com/2013/12/14/are-nativars-the-enemy>

Mike Homoya has been a botanist/plant ecologist with the Indiana DNR Division of Nature Preserves since 1982. He is the author of Wildflowers and Ferns of Indiana Forests: A Field Guide and Orchids of Indiana, both from IU Press.



At top is the nativar *Physocarpus opulifolius Luteus G (Diablo)*, a cultivar of the native ninebark that was bred for the deep purple color of its leaves as they emerge.

Below is *Itea virginica 'Henry's Garnet'* Virginia sweetspire 'Henry's Garnet', developed for larger flowers and showier fall foliage than the native species.

May 10 Plant Sale & Auction

By Deb Bell Bonte & Ross Nelson

The 2014 INPAWS Annual Plant Sale and Auction will be May 10 at Park Tudor High School, 7200 N. College Ave., Indianapolis. It is one of INPAWS' most fun and lively events and its most important fundraiser. There are some important things that members can do to contribute to the sale's success.

Empty pots and cardboard boxes are necessities at every plant sale. If you have unused cardboard boxes or pots, don't put them in the recycle bin. Instead, set them aside and drop them off from 4:00 to 8:00 pm. the day before the sale or from 7:00 to 9:00 am. the day of the sale at the "upper gym" of the school. Anyone who has wagons and/or wheelbarrows that INPAWS can borrow would help immensely, especially toward the end of the sale when auction buyers are ready to be tallied.

Plant donations from individual donors are INPAWS' number one source of plant sale plants. As soon as the ground is thawed to let you dig (right now?), please take up any plants you can spare, put them in pots and "babysit" them until the sale so they get strong and attractive. Some enthusiastic members propagate plants just for the sale and begin planning a year in advance. Others consider which plants in the garden need to be divided or thinned and will bring this bounty to the sale the night before. Plants can be brought to the school Friday from 4:00 to 8:00 p.m. or Saturday from 7:00 to 9:00 a.m.

The event starts at 9:30 Sat. with a half-hour presentation on "Native Shrubs and Trees to Enhance your Garden and Yard" by Sally Weeks, Purdue University botanist and author. There is a \$10 fee for the talk, which can be applied towards an auction purchase. The sale is open to the public from 10:15 a.m. to 12:30 p.m. and the auction takes place at 11:00 a.m. Books on native plants, other merchandise, and coffee and snacks will also be sold.

INPAWS uses VolunteerSpot, an online sign-up tool, as an easy way for members to volunteer services. If you are a past volunteer or checked "Plant Sale" as an interest when you joined, you should have received an email invitation already. If you are new or have not received an invitation, e-mail Deb at plantsale@inpaws.org as soon as

possible. Then you can use VolunteerSpot for updates and schedules.

For questions about the plant sale and auction, check www.inpaws.org under "Gatherings" or email Deb at plantsale@inpaws.org. We hope to see you at this year's plant sale!

*Deb Bell Bonte leads the 2014 plant sale team.
Ross Nelson led the team for the past three years.
Both are members of the Central Chapter of INPAWS.*

Native Plant Sale & Auction May 10

Park Tudor High School Upper Gym
7200 North College
(Enter from 71st Street)

FRIDAY, MAY 9

4:00–8:00 p.m.

Bring donated plants, pots & boxes.

SATURDAY, MAY 10

7:00–9:00 a.m.

Bring donated items.

9:30–10:00 a.m.

Presentation: "Native Shrubs and Trees to Enhance your Garden and Yard"

Speaker: Sally Weeks, Purdue University botanist and author.

Fee: \$10, which can be used as a coupon towards an auction purchase

10:15 a.m.–12:30 p.m.

Sale opens to the public.

11:00 a.m.

Plant Auction—choice items and rare finds. Also available: books on native plants, other merchandise, coffee and snacks

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Check out
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great blog at
inpaws.org



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Submissions

All are invited to submit photos, articles, news, and event postings. Acceptance for publication is at the discretion of the editor. INPAWS welcomes differing points of view.

Please submit text and high resolution photos (300 ppi) via e-mail to journal@inpaws.org.

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Summer—May 15 for July 1 mailing

Autumn—August 15 for October 1 mailing

Winter—November 15 for January 1

Membership

INPAWS is a not-for-profit 501(c)(3) organization open to the public at inpaws.org.

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President's Message

By Jeff Pitts

I'm writing this in mid-February, trusting that by the time you read it, the long frigid nights of winter will have induced a more profound appreciation for the warmth, fragrances and buzzing of Spring.

I am optimistic and enthusiastic as I assume the responsibilities of this office. Established 20 years ago with 16 charter members, INPAWS now boasts over 500 members in six chapters and spearheads a host of valuable programs and events. Thanks to the passion and hard work of many people, INPAWS has seen success and growth.

I joined INPAWS in 2009 after being summarily converted by evangelist, er, entomologist Doug Tallamy. I had attended his lecture at Butler University on the importance of native plants, particularly as the foundation for a healthy natural order which provides ecosystem services necessary for human beings to thrive on earth. I didn't have a place in my heart for indigenous flora prior to that, much less a warm place. I needed someone to help me connect the dots.

This concept – that indigenous species are foundational to life on earth – still seems to be unknown by the vast majority of the people you and I know. As we move into the next 20 years, I believe INPAWS can do even greater things. I am particularly motivated to see us continue to spread this critical message. We are a logical choice for this task.

Over the next two years, in addition to working to maintain and improve what INPAWS is already doing, I will put energy into three specific areas:

We must maximize our resources to educate



INPAWS president Jeff Pitts

Explore with the Division of Nature Preserves

Ecologists from the Indiana Division of Nature Preserves will lead several spring hikes on IDNP's properties. Hikes are free, but registration is required at www.in.gov/dnr/naturepreserve.

April 12 – Wesselman Woods, Vanderburgh County

May 3 – Bryan Memorial, Clinton County

May 17 – Tribbet's Woods and Wells Woods, Jennings County

June 21 – Ambler Flatwoods, LaPorte County

June 29 – Mounds Fen, Madison County

Hikes

others on the critical role of indigenous species in maintaining healthy ecosystems.

For our influence to be optimized, we must broaden our ranks to include more youth and young adults. Many of us have gray hair – we need to be infecting the next generation with our passion, so as to tap their energy, ideas and longevity.

We must collaborate with like-minded others to most effectively accomplish our mission. The whole is greater than the sum of its parts; we can see greater accomplishments over the long term if we collaborate with those who share our passions and commitments.

Historically, a steward is one appointed to care for the property of another. The Earth is not ours; we are here only for a while. We are sojourners, and we are called, during our pilgrimage on Earth, to be its stewards. Environmental stewardship has never been more important. May our society become an army of environmental stewards moving into our spheres of influence knowledgeably, persuasively and peacefully, to protect, preserve and reclaim our natural heritage for coming generations.

INPAWS funds forbs in prairie restoration

By Adam Thada

INPAWS at work

wikimedia

wikimedia

For 20 years, students and faculty of Taylor University have been conducting research at the Upland Prairie Restoration, a Grant County site that has become overly dominated by warm-season grasses such as *Andropogon gerardii* (big bluestem). This dominance is likely the result of limited forb seed in the original seed mix, as well as the lack of historically appropriate disturbances over the past two decades. One of our main restoration goals is to increase the native floral diversity of the site.

In such a competitive environment, some disturbance is needed to compromise *A. gerardii* and open up light resources for germinating seeds. Thanks to a grant from INPAWS, I was able to purchase local ecotype prairie seed for my thesis project. I researched two different types of disturbance methods used to aid interseeding of forbs:

- 1) biomass removal of the accumulated thatch (haying vs. burning) and
- 2) application of a grass-specific herbicide.

Five species were sown in the spring of 2013 after thatch removal: *Parthenium integrifolium* (wild quinine), *Eryngium yuccifolium* (rattlesnake master), *Baptisia alba* (white indigo), *Pedicularis canadensis* (wood betony), and *Rudbeckia hirta* (black-eyed Susan). Herbicide was applied in May and June while *A. gerardii* was actively growing. The grass was visibly browned and stunted, but there was no mortality even after two applications. As expected, treated sites had significantly less aboveground biomass. Untreated sites grew thick and tall with grass, which quickly shaded out

many of the sown seedlings.

Overall, forb seedlings were 50-75% more abundant in herbicide-treated plots, especially those of *B. alba*, *P. integrifolium*, and *R. hirta*. *E. yuccifolium* did equally well in treated and untreated plots, suggestive of its "conservative" establishment habit. Many land managers have praised *P. canadensis* for its hemiparasitic relationship (ability to live independently or as a parasite) to *A. gerardii*, but it failed to germinate in my trial.

Plants also differed in size as well as abundance. *P. integrifolium* seedlings in untreated plots were quite small, rarely growing more than two inches. Many of the seedlings in treated plots were four inches or larger, the tallest reaching eleven inches. Not a bad first year as far as perennial prairie plants go!

These results suggest that a grass-specific herbicide may be an appropriate and affordable tool for adding forb diversity to grass-dominated prairie restorations.

No differences were found between hayed and burned plots in the first year, though some research suggests that in comparison to fire, haying could cause less damage to establishing forbs and be less stimulating to warm-season grasses.¹

During the course of my field work, I recruited and trained several volunteers to assist with seedling identification, biomass estimation and plot maintenance. I also presented my research at several regional conferences, including the Indiana Academy of Science.

I am indebted to the INPAWS membership for making this research possible, to my advisors (Scott Namestnik, Robert Reber, and Dr. Paul Rothrock), and to Leland Boren for making the prairie available. Thank you for supporting the stewardship of our natural heritage.

Adam Thada lives in Grant County on the Mississinewa Moraine. He is finishing his Master of Environmental Science degree at Taylor University and is looking forward to a career in natural resources stewardship.

¹ Tix D, and Charvat I. 2005. Aboveground biomass removal by burning and raking increases diversity in a reconstructed prairie. *Restoration Ecology* 13:20–28.

Wild quinine (*Parthenium integrifolium*), top, and *wood betony* (*Pedicularis canadensis*) were among the native species sown in an attempt to increase floral diversity at a site in Grant County.

Polyculture & “the amiable farmer”

By Hilary Cox

Recently I have been popping over to Hazel's for my lunch breaks to watch the James Herriot series "All Creatures Great and Small." (She has Netflix!) The early series recalls my parents' era – the 1930's, prior to World War II. The middle series is from my childhood and takes me on a nostalgic trip down the 1950's memory lane.

Each year in July our teacher parents would pack us three children and all our camping equipment into our Ford Thames van – proudly named Cake'ole, Yorkshire slang for a large mouth, so-called for the van's capacity to swallow five people plus everything else – and off we would go on our summer holiday.

We would head off to various parts of the UK, wherever the weather promised the best, find a suitable farm with an amiable farmer, and set up camp.

These farms were similar in their set-up across the British Isles and very similar to those in the TV series: a few sheep, a couple of cows, some pigs with piglets, chickens, maybe a horse or two, though these were getting scarce even then. There would be hayfields, cornfields ("corn" in England is actually wheat), a vegetable garden, maybe a small orchard with apples, pears and plums. Well-tended hedgerows provided nuts and berries. Diversity at work.

With the farmer's encouragement we learned the arts of milking cows, ringing pigs, gathering eggs. If the farm was situated close to the coast, we would rent a rowing boat and go mackerel fishing. Idyllic.

Fast forward to today.

With the advent of industrial agriculture, those diverse small farms have disappeared off the face of the earth, and in their place are large herds of cattle milked by machines; chicken and turkey factories; and vast expanses of land covered in a single crop, with no dividing hedgerows – all on a previously unimaginably large scale. In the process, much of what little was left of Britain's natural habitat disappeared, too.

One term for this kind of agriculture is "monoculture," the opposite of diversity, and with it has come a multitude of "unexpected" problems. By the 1980's British farmers were already experiencing soil erosion and unprecedented "dead

spots" on land where nothing would grow ... ever again. If a pest, virus or bacteria hit, the whole crop/herd would be endangered, threatening the farmer's livelihood, instead of just one small part of a diverse farm. Of course, this all happened on a much grander scale and somewhat earlier in the US.

Now we need "studies" done: Andersson, G. K. S., K. Birkhofer, M. Rundl and H. G. Smith (2013). "Landscape heterogeneity and farming practice alter the species composition and taxonomic breadth of pollinator communities" to tell



us "the effects of landscape heterogeneity and farming practice on species composition."

Studies have already been conducted into those effects on species richness! And we have to be told that "species richness declines with decreasing landscape heterogeneity but taxonomic breadth only declines ... on conventionally managed farms" – "conventionally" meaning using current practices. But aren't these results just common sense? Didn't those old-time farmers know these things without being told?

Amiable Farmer – continued on page 13

Resurrection Fern

Plant Profile

By Michael A. Homoya

When searching for wild ferns, most people look to the ground or on rocky slopes or cliffs, but to see one certain species, binoculars and a crooked neck are sometimes in order. The species, known as resurrection fern (*Pleopeltis polypodioides*), creeps along on bark high in the branches of trees.

Its growth habit is epiphytic, a term describing plants that grow on other plants (epiphyte: epi = upon, phyte = plant). Although resurrection fern anchors its roots on tree bark, it does not penetrate the stem. Thus it is not a parasite because it does not siphon water and nutrients from its host.

The big deal for us about resurrection fern is the simple fact that it grows here. No other true vascular epiphyte occurs within Indiana's borders. And although there are other epiphytes here such as mosses and liverworts, they are typically very small and without vascular tissue.

Vascular tissue, which functions something like an animal's circulatory system, carries nutrients and water throughout the plant. All of our "big" plants – flowering plants, conifers, and ferns – have vascular tissue.

Resurrection fern isn't always an epiphyte, however. Most Indiana populations of this fern grow on rock. Indeed, in Indiana it is an extremely rare sight to see it growing on a tree. Charles Deam, Indiana's dean of field

botany, stated in his 1940 *Flora of Indiana* that he had observed it as an epiphyte only once (Posey County).

Likewise, I have encountered the fern as an epiphyte at only one place, on an elm tree in southern Harrison County. One other report from along Little Blue River in Crawford County brings the total known epiphytic occurrences to three. Although it commonly grows as an epiphyte in the deep South, it obviously isn't common here!

All of the Indiana populations of resurrection fern occur south of Bloomington. A related and similar-looking species, the common polypody, is also mostly southern but does occur on the sand dunes near Lake Michigan. It is not epiphytic. Common polypody is easily confused with resurrection fern, but is larger and does not possess the latter's numerous scales on the stem and blade under-surface.

Two adaptations allow resurrection fern to grow at our latitude. One is its tolerance of cold temperatures. The other, and perhaps most important, is its ability to survive drought. Tree bark retains little moisture, and thus in dry times the fern grows in a virtual desert.

During drought the fern blade curls down and inward, transforming it into what looks to be a dried-up leaf ball. It may appear dead, but it's not, as this posture allows the plant to conserve precious moisture. Weeks of drought may pass, and then with the next rain the fern blades unfold. "Resurrection" has occurred.

Resurrection fern is evergreen and so can be seen in winter. Dry rock cliffs with a southern exposure are the most likely sites for discovery. To find it on rocks is challenging enough, as the fern is rare here, but if you really want to test your hunting skills, just remember to look up!

Mike Homoya has been a botanist with the Indiana Division of Nature Preserves since 1982. He is the author of *Wildflowers and Ferns of Indiana Forests* and *Orchids of Indiana*, both from IU Press.

Reprinted with permission from the Jan./Feb., 1997, issue of *Outdoor Indiana*.



Richard Fields

At a height of 30 feet above the ground, resurrection fern grows on an elm tree in Harrison County. Dry slopes with southern exposure provide suitable habitat for the rare Indiana specimens.

Indy Cultural Trail

Plant-wise Guides Wanted

By Deb Bonte Bell

Do you live in the Indianapolis area? Do you enjoy the vibrant downtown, meeting people, and educating others about native landscaping? The Indianapolis Cultural Trail is looking for volunteers with native plant expertise to guide hiking or biking tours of the trail.

The Indianapolis Cultural Trail is an eight-mile paved trail through the heart of the main cultural districts of Indianapolis. In 1999, the city officially designated six cultural districts: Massachusetts Avenue, Fountain Square, The Canal and White River State Park, Indiana Avenue, the Wholesale District, and Broad Ripple.

Cultural Development Commissioners (CDC) were appointed, charged with promoting the city's cultural assets. Brian Payne, president of Central Indiana Community Foundation, was a CDC who believed the cultural districts could be connected by an urban version of the Monon Trail for pedestrians and bicyclists.

In 2004 funding was found to begin the trail, including a generous \$15 million gift from Eugene and Marilyn Glick. Different sections were completed each year using city sidewalks and easements. It opened to great national attention last May with a total cost of \$63 million.

Visitors can hop on and off the trail at any point; there is no beginning or end. It is a delightful tour that includes IUPUI campus, the Central Canal, and downtown streets in a safe, friendly environment. It also connects with the Monon Trail, which runs as far north as Westfield.

A feature showing great foresight and ecological awareness is that the trail is lined with many native plants and outfitted with stormwater planters. The landscaping was designed by a team under Kevin Osburn at Rundell-Ernstberger, a landscape architecture firm that has won INPAWS awards in past years. It is maintained year-round by the Brickman Group along with volunteers.

The trail truly is a treasure as a resource to educate the public on native plants and to beautify and improve the ecology of downtown Indianapolis. A listing of the plants you might

see there is on their website.

A two-person staff can supply you with information to use if you wish to become a guide. They are happy to work around volunteers' schedules and would be thrilled to have INPAWS members add plant expertise to their tour team.

For more information on the trail, listings of plants used, or becoming a guide, visit their website at www.indyculturaltrail.org or call Lauren Day at 317-454-8527.

Deb Bonte Bell is a member of the INPAWS Central Chapter.

Amiable Farmer – from page 11

And along comes polyculture, by definition: "agriculture using multiple crops in the same space, in imitation of the diversity of natural ecosystems, and avoiding large stands of single crops." (Wikipedia)

Dr. Peter Raven, who gave the keynote speech at INPAWS' 20th annual conference, equated diversity to sustainability. So my equation goes like this: Polyculture = Diversity = Sustainability.

Which takes me right back to James Herriot and his stories and my experiences on the small farms of Great Britain in the 1950's. Without any studies to tell them how, those farmers practiced sustainability and diversity because otherwise they went out of business. So maybe by returning to a more observant style of agriculture, under whatever name we choose, by fixing broken and destroyed habitats (see "reconciliation ecology," Wikipedia) we might expect to see some of our wildlife return ... especially pollinators.

Nowadays the small farm with the amiable farmer willing to let a strange family camp on his property and encourage three young children to learn about farming and nature is hard to find. For the sake of the future of our planet, I hope they do still exist and that they understand polyculture.

Hilary Cox is a garden designer, freelance writer and photographer, and member of INPAWS Central Chapter.



A holey oak leaf is evidence of the food chain at work. Insects munch leaves; birds munch insects, and so on and on. (photo by Lynne Tweedie)

By Tony Juniper

What Has Nature Ever Done for Us?

Book Review

Review by Patricia Happel Cornwell

Tony Juniper is not a tree-hugger. He is a scientist.

The not-so-subtle subtitle of Juniper's book *What Has Nature Ever Done for Us?* (Synergetic Press, Santa Fe, 2013) is *How Money Really Does Grow on Trees*.

For those searching for factual ammunition to back up their intuitive sense that the planet is in peril, this book is a treasure trove of data about the services nature renders to mankind and their monetary worth. The author

of world we are leaving to future generations. Juniper, as Raven, refrains from screaming "The sky is falling!" and sticks to facts to demonstrate to what degree we are simultaneously using up and degrading the natural resources upon which our very lives – and those of our grandchildren – depend.

Juniper is well aware of the short-sighted economic drivers that motivate the destruction of habitat around the world. He weighs the short-term gains and long-term losses of many human decisions. He writes of the loss of forests:

STATISTICS

100	Percent of human support systems dependent on nature
1	Number of planets capable of supporting human life
Larger than Germany	Area of forest cleared 2000 – 2010
\$1 trillion	Annual sales dependent on animal pollination
0.03 %	Proportion of world's water that is fresh rather than salty
\$200,000 - \$900,000	Value of 1 square kilometer of mangrove forest
\$6.6 trillion	Annual global environmental damage caused by human activities
\$72 billion	Annual sum needed to avert mass extinction of animals & plants
1.2	Percent of world GDP represented by \$72 billion

From the book *What Has Nature Ever Done for Us?*

discusses the work that soil, light, water, plants and pollinators do, how their effectiveness is in many places being compromised by human interference, and how interwoven our lives are

"None of us is outside nature."

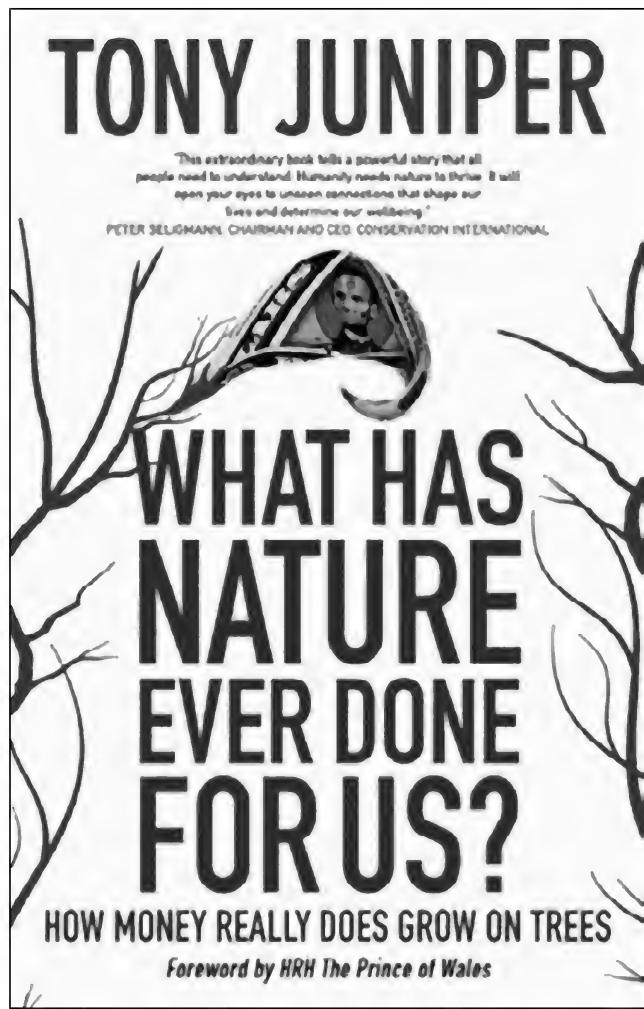
with other elements of sea, sky and earth.

As I read, I heard echoes of the sustainability presentation made by Dr. Peter Raven at the INPAWS conference last November. This book underlines the urgency of facing up to the kind

"For what are evidently reasons of culture, we treat the carbon in trees as for the most part worthless, whereas diamonds, made of pure carbon, are exchanged for huge sums. Diamonds have some industrial applications but, considering the climatic benefits of carbon in trees, this comparative valuation is utterly perverse."

He explains how mangroves diminish the landfall impact of tsunamis and hurricanes, saving human lives and property, yet in some places they are being destroyed to make room for shrimp farms or commercial

development. I remembered how the tangled roots of mangroves hurt my bare feet as I waded from a boat to an iguana island in Lago Ovieda in the Dominican Republic in 2012. Suddenly, I understood how they could indeed slow down a storm surge in Louisiana or India.



Juniper delves into the health effects of contact with nature. Studies show that people who live near green spaces feel healthier than those who do not. The greater the wildlife diversity, the higher the level of psychological well-being also reported by study

participants. (As I write, 16 species of birds pick seeds out of the snow beneath my window. A fox pokes around at the pond. A herd of white-tailed deer slips silently over the hill. Meanwhile, my granddaughter is growing up in a city.)

Juniper writes: "At no point in our history have so many humans spent so little time in physical contact with animals, plants and the processes that govern the natural world. We are suffering from Nature Deficit Disorder."

Interestingly, he uses without attribution a term coined by Richard Louv in *Last Child in the Woods*: "Nature Deficit Disorder."

What Has Nature Ever Done for Us? is full of fascinating information about everything from algae to asteroids, reefs to rainforests, wetlands to wolves. Juniper is a Brit, so you may occasionally have to convert a kilometer to miles or a kilogram to pounds, but it is well worth the effort.

An "independent environmentalist," he is advisor to the Prince of Wales Charities, a fellow of the University of Cambridge Program for Sustainability Leadership, and first president of the umbrella organization, the Society for the Environment. HRH Charles, Prince of Wales, wrote the foreword to this latest book. It's a keeper.

Patricia Happel Cornwell is an Indiana Master Naturalist, a bird-counter for Cornell Lab of Ornithology, a freelance writer and editor of the INPAWS Journal. She lives in Harrison County.

*"When one tugs at a single thing in nature,
he finds it attached
to the rest of the world."*

— John Muir



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Oaks – the mastiest of our native plants



Host Plant

Oaks are champions at producing mast. Mast is the term for foods produced in natural habitats from trees, shrubs and other plants. The supply of mast affects survival and reproduction of many species in our environment.

Leaves, twigs, and especially acorns are mast. Indiana's Department of Natural Resources website reports that "acorns are perhaps the most important food source for a variety of wildlife, including ducks, songbirds, woodpeckers, ruffed grouse, turkey, quail, pheasant, deer, rabbits, squirrels, chipmunks, and mice"

Oak trees also top Douglas Tallamy's list of "Best Bets: Woody Plants" (www.bringingnaturehome.net) According to the famous entomologist's reckoning, oaks support 534 species of butterflies and moths. Those butterflies and moths, in turn, feed spiders, birds, and many other species.

In other words, planting an oak tree could be the best thing you can do for your little piece of the planet. Indiana is home to 19 species of oak including white, red, scarlet, black, swamp, shingle, overcup, swamp chestnut, chinkapin, cherrybark, shumard, pin and post. Over the centuries, in collaboration with other species, oaks adapted to our many microclimates. Perhaps there's an oak tree just right for yours.



inpaws journal

Indiana Native Plant and Wildflower Society

Summer 2014

The Secret Life of Trees

By Holly Faust

Trees are the largest living things on earth. The impressive blue whale, the largest animal to have ever lived on earth at 100 feet long and upwards of 200 tons, pales in comparison to the largest trees. Some of the tallest



© S. Dickerson

According to the 2010 Indiana Big Tree Registry, this cherrybark oak (*Quercus falcata* var. *pagodifolia*) is the biggest of its kind in Indiana. It lives on the grounds of the Evansville State Hospital in Vanderburgh County. The tree is 98 feet tall with a crown that spreads 131.5 feet.

trees recorded are over 270 feet high and the heavyweights are recorded at over 6,000 tons.

We only know of the largest trees recorded by man, so this does not include trees of the past 300 million years. And we can only record what is above the ground – not the massive root system that makes up two-thirds of the actual tree.

Trees have provided food, medicine, shelter, clean air and water for the entire planet for over 370 million years. Trees are also the longest living organisms on earth, with some individuals over 5,000 years old.

Trees use their leaves to trap and filter out

dust and pollen particles carried in the air. An average adult human consumes 651 pounds of oxygen annually. It takes on average 30 trees to offset this consumption. Fifty full-size trees are required to supply the annual oxygen demand of one family's automobile.

Trees' fallen leaves blanket the forest floor, protecting the soil from erosion, keeping it moist and adding nutrients. Trees' leaves and branches greatly reduce the impact of pelting

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raindrops, sleet and hail. This also reduces erosion and helps water seep into the ground, filling wells and aquifers and keeping streams and rivers flowing at a more constant rate.

These same leaves and branches give a cooling effect to our homes and businesses. One moderate-sized tree has as much cooling effect in a city as 20 average room air-conditioners running 20 hours per day. This is all done with no demand on your electric power! Shade trees can cool your home by as much as 12 degrees on a hot summer day.

Here are two myths about trees that need to be dispelled.

Myth # 1: Trees' roots break sewer lines. Most tree roots are found in the top two feet of soil, well away from sewer lines. Some however do

Trees – continued on page 10

Crash Course in Sphagnum Mosses or Why There Are Very Few Bryologists

By Barbara Plampin

I've rashly let a friend talk me into signing a contract to help him find, identify, and report to the Indiana Dunes National Lakeshore (IDNL) botanist on the sphagnum or peat mosses in Porter County's Cowles Bog Wetland Complex (CBWC), all before September 15th. Several peatlands – including bog, fen, marsh, swamp, and forest – occur in this national natural landmark, which is now under restoration.



wikimedia

"So far I know
that sphagnums
come in green,
red, and dead
..."

— Barbara Plampin

So far I know that sphagnums come in green, red, and dead – dead as in hanging basket liners (sphagnums can hold up to 25 times their weight in water) as well as milled (ground up) to add to garden soil, and in chunks for fuel.

I know that sphagnum influences the surrounding plant community, creating such acidity that only special plants like the carnivorous pitcher can thrive in it. I know sphagnum can preserve unlucky mammoths, and I've seen in the British Museum the unfortunate Lindow Man, hypothesized to be the victim of Druidical sacrifice. Legless and flattened under pressure in peat since ca. AD 60, he resembles a highly polished brown leather suitcase.

I could also distinguish sphagnum from other mosses but couldn't explain why until my friend lent me Cyrus B. McQueen's more or less

pocket-sized *Field Guide to the Peat Mosses of Boreal North America* (New England, 1990). Indiana counts as boreal because of ancient climate conditions. Five hundred million acres of peat in North America hold approximately 300 species of sphagnum, of which Indiana is home to about 50. Currently, CBWC sphagnum species are down to six, fewer than hypothesized in a 1984 report.

McQueen helps one key out 26 species without a microscope and provides another key for those that need one. He provides color photos and drawings.

How to identify sphagnums? Tools include a 10- to 20-power hand lens, tweezers, a small metric ruler, perhaps a field microscope, and a permanent marking pen for staining.

Looking down while walking along, I observed erect stems, each topped by a neat to shaggy, somewhat daisy-like head or capitulum (pl. capitula). Only sphagnum mosses have capitula. Capitula come flat, domed, or hemispherical. The flower-like discs (center) are bud-like terminal branches. The rays are longer, more developed branches. Rays may be more or less prominent. Flat-topped capitula may resemble five-rayed stars. The common *Sphagnum gerstenii* (no English names, apparently, for sphagnums), which McQueen says has stems that snap apart like celery, is especially stellate.

Below the capitulum appear branches arranged in bunches or fascicles. Bryologist Howard Crum writes, "Each fascicle consists of two or more spreading branches and one or more pendant (hanging) branches ... the number and kind of branches in each fascicle are important clues to species identification." The stem itself also bears leaves.

Identification takes into account the shapes of both branch and stem leaves. Here, because both leaf types come in millimeters, staining them with a marker can be useful. All goes well if plants are anisophyllous, i.e., have distinctly different stem and branch leaves. Such plants often indicate "optimal habitat conditions." But sphagnums are shape changers. Unfortunately, they may grow under "some hydrologic stress" and exhibit stem and branch leaves differing

Mosses — continued on page 5

Sweetgrass

Holy by Some Accounts

By Michael Homoya

Some say sweetgrass (*Hierochloe odorata*) is sacred, a holy plant. This is even reflected in the botanical name, formed by combining the Greek words *hieros* (sacred) and *chloe* (grass). Sweetgrass occurs naturally in boreal and temperate regions around the globe and is viewed as an essential component of sacred ceremonies by people of several religions.

In Europe sweetgrass, or *Mariengras* (Mary's grass) as it was traditionally known in Germany, was spread in front of church doors on saints' days. Amazingly, on a continent an ocean away, Native Americans used the very same species to construct braids to burn as ceremonial incense. Dried stems of the grass also were used to make baskets for storage of special items including children's dried umbilical cords.

What is it about sweetgrass that it is revered by so many? Clearly, it must be its delightful – make that “heavenly” – sweet scent emitted by its stems and leaves. The fragrance is reminiscent of vanilla, hence another of its names, vanilla grass. The scent is not all that perceptible when leaves and stems are fresh, but develops in the drying process. It persists for years, being especially noticeable on humid days. It also can be burned for incense.

Sweetgrass is a rather uncommon plant in Indiana, occurring sparingly in sunny wetlands in the northern half of the state as far south as Randolph and Tippecanoe counties. It is perhaps most regularly found in alkaline fens and other seepage wetlands – places where groundwater

flows to the surface and spreads in a diffuse manner, usually through highly organic peat and muck soils. It also occurs in moist prairie.

The attractive golden florets of sweetgrass bloom early in spring, usually before most other wetland plants. Typically this is mid-May, but it can be as early as April in some years. From the buried rhizome the mostly leafless flowering stalk emerges and develops first, followed by a separate leafy shoot. The floret is a true flower, just as much so as a lily or rose. Although the flowers of grasses may look different from typical ones, they nevertheless possess the capability of sexual reproduction, the primary function of a flower.

Whether divinely appointed or not, sweetgrass is clearly a plant of high favor. Thus, if you are tempted to gather some sweetgrass, know that finding it in Indiana is not all that easy. Although the long, tapering leaves of sweetgrass are quite shiny, making it rather distinct from other plants with which it grows, one normally finds only a few stems scattered here and there. Given this, and that the plant is not all that common in the state, perhaps the best way to procure leaves and stems of sweetgrass is to cultivate it. It can be grown successfully in cool, moist soil

kept free from competing weeds. A search on the Internet will reveal nurseries that offer it for sale. Enjoy!

Mike Homoya, a botanist with the Division of Nature Preserves, keeps a small sample of you know-what at his desk for his olfactory pleasure.

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A Jump Start on Flower ID

Or An Easy Guide To Central Indiana Flowers In Bloom

By Amy Perry

Norma Wallman's *Wildflowers of Holliday Park: A Pictorial Guide Organized by Blooming Season* (Self-published, 2013) is not only beautiful, but useful. The book is meant to be used as one

encounters flowers in bloom on the park's trails, but it can be helpful in other locations. (Disclaimer: I assisted with the introductory sections of the book but not the body.)

The park is named for John Holliday, who donated his estate to the city of Indianapolis in the last century. A public urban park of just under 100 acres, it includes wetlands, seeps, floodplain, prairie, and developed areas.

The strength of the 194-page book lies in the close-up color photos and their arrangement not only by blooming season, but also by order of bloom within each season. Except for flowers that bloom across seasons, this arrangement means that flowers not in bloom at the time are already ruled out, thus giving the user a significant head start on identification. The blooms are shown in close-up detail, two to a page, making it easy to compare the photo with the plant you see.

Although the complete leaves are not always shown, usually enough is shown to confirm identification. Also the type of leaf (e.g., lobed, divided/compound) and leaf arrangement (e.g., opposite) are listed. In addition, for every species, the book provides the item number in Kay Yatskievych's

Field Guide to Indiana Wildflowers and the page number in Laurence Newcomb's *Wildflower Guide*, two highly respected references. To ensure accurate identification, the author, not a trained botanist, consulted many reference works as well as professional botanists.

Each entry also provides common name, scientific name, family, bloom dates, number of flower parts, bloom color, whether the species is an Indiana native, habitat, and a comment. In general the comments are useful and interesting, and reading them is like hiking with a knowledgeable and delighted guide.

Helpfully, the book includes weeds and non-native species that were planted when Holliday Park was planned to be a world-class botanical garden. (Some of those planted species have escaped into the woods.) For this reason the book is also useful in other locations. If the flower you are trying to identify is not the exact species shown in the book, it could be in the same genus or family, and the book has given you a head start.

The book lived up to its subtitle in a test on May 14. I pretended I did not know any of the species I saw. I identified seven species out of seven in 27 minutes. Two were species I would not have known without the book.

I encountered only two flowers I could not identify. One was only in bud and the other, it turned out, was in one of the gardens planted by the park staff. I later realized the book does not include the planted gardens per se. A suggestion for improving the book is to specify precisely the locations of the developed areas--the areas whose flowers (although native) are not in the book because they do not occur in the undeveloped areas.

The book fits into a passport necklace, thus leaving room for other items in your pockets or pack. The more than 400 photographs, all taken by the author, make it very attractive. I observed a ten-year-old girl spend quite a while looking through the book and reading it to her mother. I can easily see this book being instrumental in interesting more people in wildflowers and native plants.

I hope the author writes a similar guide to shrubs and trees of Holliday Park. I could use that guide as I walk around my neighborhood. I

Holliday Park – continued on page 9



Three Book Reviews

“Stung by Bee Fever”

The Quest for the Perfect Hive

by Gene Kritsky

Oxford University Press, 2010

This book is the history of innovation in bee culture. The story is engagingly written and the photos are very helpful in illustrating some of the ideas and hive designs. I got “stung” by bee fever a couple of years ago. I have been reading books and listening to bee experts and combing the web since then for info on honey bees, native bees and other pollinators. I became interested in types of hives and the history of how they came to be. Kritsky travelled the world to search out the history of how honey bees were domesticated and how we have used bees over the centuries. I was immersed in the world of bees and their relationship with man. I definitely recommend it to anyone interested in how the honey on your table came to be there.

Keeping Bees

by Ashley English

Lark Crafts, Sterling Publishing, 2011

This book is all you need to know to tend hives, harvest honey and more. It is the first book I have read solely about keeping bees. I love that the first chapter is about understanding the bees. From there English walks you through step by step, from how to get started all the way to the harvest of the golden liquid. It is well-written, engaging, informative and demonstrative, a great book for the first-timer. The illustrations are priceless in teaching about the equipment and processes that go along with bee-keeping. Fun read!

The Bumblebee Queen

by April Pulley Sayre

Charlesbridge Publishing, 2005

This is an excellent children’s book, very well-written and beautifully illustrated. The illustrations use native plants and birds in vibrantly colored pictures to simply show us the life of a bumblebee queen throughout

the seasons. It has additional information encircled on several pages. Two pages in the back are titled “More Buzz about Bees”, giving the reader more information and sources to pursue. If you have children, or just the inner child in yourself, to read to, this is a wonderful, fun book about bumblebees. I found it through the Xerces Society web site. This book received the Bank Street Colleges of Education’s Best Children’s Book of the Year Award.

Reviewer Holly Faust is an interpreter with Hamilton County Parks & Recreation and a member of INPAWS Central Chapter.

Mosses

Continued from page 2

only somewhat, in what is called the hemiisophyllous form. When water levels vary, both kinds of leaves may be indistinguishable, assuming the isophyllous form. Enter the microscope and more technical books to examine cell arrangements to distinguish between the merely very difficult and the maddening species.

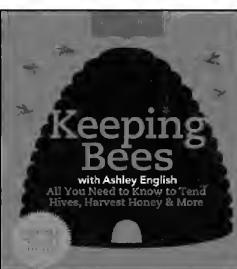
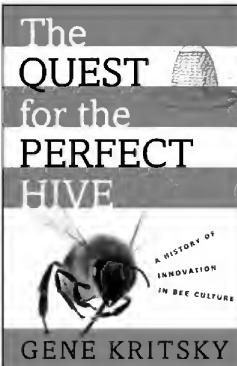
The best time to find differentiated leaves is summer when water levels are most stable. Optimally each species grows in specific water-level, nutrient and light conditions, i.e., wet-to-dry, degrees of acidity, and gradations of light to shade. Match the species to the habitat!

For example, *S. magellanicum* has “plants large and robust, usually forming mats and low hummocks in open bogs ... usually red to purple red, sometimes pink ...” In shade, however, its color is green. Being precise, McQueen gives seven shades of brown, six each of green and red, three of yellow, two pinks, light orange, and “almost black.” His color photos show up to four species cozily intermingling, some nearly indistinguishable from each other. Gather clumps of peat moss and pull them apart?

I still have the cells to face. Maybe my ability to ask questions and my writing skills will get me by in this summer job?

Barbara Plampin is a life director of the Shirley Heinze Land Trust and a field biologist.

Book Reviews



Native Plant Sale Has Wide Impact

By Deb Bonte

The May 10 native plant sale at Park Tudor High School, Indianapolis, was a resounding success! As always, the sale was supported by generous INPAWS members who donated plants from their yards, and by several nurseries. A record number of plants resulted in a very busy day and great sales, which will help fund future INPAWS projects and small and large grants.

Nearly 50 volunteers were involved, including folks who drove the week before to pick up plants at nurseries and members' homes, those who helped with plant rescue digs in parks and yards, and native plant experts who identified and labeled plants the day before and morning of the sale.

Our plant rescue co-chairs, Jeannine Mattingly and Dee Ann Peine, organized several digs, which truly impacted the success of the sale.

A special thanks goes to our morning speaker Sally Weeks, a dendrologist and author from Purdue University. She had a record attendance of 78. Those people were then allowed to enter the sale 15 minutes before the public, and the excitement began!

Riveting discussions ensued as attendees spoke with our volunteer plant experts about what to buy and where to put a plant in their yard. Our longtime auctioneer Mike Stelts conducted the auction of rare and special specimens, and plant experts Hilary Cox, Sue Nord Peiffer and Kevin Tungeswick introduced each plant up for sale with anecdotes and tips on the characteristics of each plant. Some say our auction is like a mini-botany lesson.

At the end of the sale a few plants were left. Some were bought and donated to Daubenspeck Community Park to enhance their woodlands and education program.

People attended from at least 20 counties. They heard about the sale from more than 15 different sources. Besides being INPAWS' largest fundraiser, the sale is increasing the appreciation of native plants around the entire state.

Deb Bonte is 2014 plant sale chair and a member of INPAWS Central Chapter.

INPAWS In Action

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www.mononcoffee.com

Nov. 1, 2014

Plans Set for Conference

By Tom Hohman

The 2014 INPAWS annual conference is still several months away, but speakers have already been engaged and plans put in place for expanded events. The conference will be Nov. 1 at the Bloomington/Monroe County Convention Center. The conference will feature two exciting keynote speakers.

Lincoln Brower

Professor Brower is one the country's foremost authorities on the monarch butterfly. A leader in conservation efforts, he has studied the habits of the monarch for over 50 years. Dr. Brower is professor emeritus at the University of Florida and a research professor of biology at Sweet Briar College.

Gerould Wilhelm

Jerry Wilhelm is the principal botanist/ecologist with Conservation Design Forum and co-author with Floyd Swink of *Plants of the Chicago Region*. The pair developed the FQA (Floristic Quality Assessment), a practical tool used throughout the continent to evaluate the quality of native plant communities. He is working on a new book entitled *Flora of the Chicago Region: An Ecological Synthesis*.

Additional Speakers

Eric Knox is director of Indiana University Herbarium. Before accepting that position, he worked for 10 years in Africa. He also teaches at IU on plant evolution and the local flora of south-central Indiana.

Ellen Jacquart is director of northern Indiana stewardship for The Nature Conservancy. She is also chair of the invasive plant advisory committee for the Indiana Invasive Species Council and team leader of INPAWS' invasive plant education committee.

Heather Reynolds, associate professor of biology at Indiana University, specializes in plant community ecology. She and her lab group research plant/environment interactions and their applications to the restoration of native

plant communities and sustainable agriculture.

Bill Weeks is director of the Conservation Law Center in Bloomington. He is former executive vice president of The Nature Conservancy and a past director of its Indiana chapter.

Special Hotel Rate

After several years of holding the conference in Indianapolis, it is time to go outside of Indy. This has advantages or disadvantages, depending on where you live. To help those who live far away or just want to get there early, INPAWS has arranged with TownePlace Suites by Marriott in Bloomington for a block of rooms at a special conference rate of \$99.

TownePlace Suites is located at 105 S. Franklin Road, near SR 37/45 and 3rd St. To get this conference rate, call TownePlace at 812-334-1234 and mention "INPAWS". Or, if you go to the INPAWS web site's conference information page, there is a direct link for conference hotel reservations. **Hotel reservations must be made by Oct. 3 to get the conference rate.** There are also other hotels in the area.

Friday Evening Activities

It has been a tradition for INPAWS officers and conference organizers to socialize with the speakers the evening before. This is an opportunity for us to get to know the speakers and help them feel comfortable. This year we have reserved a room at Crazy Horse Restaurant in downtown Bloomington, where we will have an open house (with cash bar) for all conference attendees to meet the speakers. This will be another incentive for those considering arriving early.

Consider becoming a sponsor of the conference or setting up a display for your favorite non-profit organization. A range of prices is available. Exhibitors for non-profits are allotted a space and table for a minimal cost. We have ample space and would like to fill the room with interesting and informative displays. Details are available on the INPAWS web site.

Look for more conference details and speakers' exact presentation topics in the fall issue of the INPAWS Journal. See you in Bloomington!

Tom Hohman is 2014 conference team leader and head of Central Chapter's Invasives SWAT Team.



William P.C. Barton (1786-1856) included this botanical illustration of Rudbeckia purpurea (now called Echinacea purpurea) in his book, *A Flora of North America*, in which he wrote that while European scientists had studied the plants of the new world, American scientists had neglected their own native plants.

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All are invited to submit photos, articles, news, and event postings. Acceptance for publication is at the discretion of the editor. INPAWS welcomes differing points of view.

Please submit text and high resolution photos (300 ppi) via e-mail to journal@inpaws.org.

Submission deadlines for specific issues are:

Spring—February 15 for April 1 mailing
Summer—May 15 for July 1 mailing
Autumn—August 15 for October 1 mailing
Winter—November 15 for January 1 mailing

Membership

INPAWS is a not-for-profit 501(c)(3) organization open to the public at inpaws.org.

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Please direct Information of interest to webmaster@inpaws.org.

INPAWS Strategic Plan

President's Message

By Jeff Pitts

I am writing on the eve of Memorial Day weekend – outside my French doors the air is filled with engine noise from the Hoosier Hundred dirt track race at the State Fairgrounds. I'm looking forward to summer; it was a long winter.

The INPAWS Council, made up of elected state officers, chapter presidents and leaders of standing teams, has met three times so far this year: twice for regular quarterly business meetings and in March for a leaders' retreat. One of our primary goals has been to complete a Strategic Plan. This document will serve as a guide for action, providing structure and steps for accomplishing our mission. I'm excited to report that the Strategic Plan was adopted at spring council on May 13. The time frame spans 2013 to 2016.

The priority goals are to:

- Establish a robust volunteer orientation and engagement process.
- Improve the quality of information available concerning native plants and invasives.
- Expand the youth outreach program to nurture more of tomorrow's stewards of the environment.
- Pursue partnerships and collaborations with other agencies, organizations and schools that could promote native plants as essential to healthy ecosystems.
- Develop a long-term financial and supervision plan that would allow for paid administrative support.

Two additional goals are to:

- Revisit governance structures to clarify state officer roles and distinguish between state and regional chapter responsibilities, resulting in seven active regional chapters of INPAWS in the state and updated bylaws.
- Expand the use of communications technology to establish audio/video conferencing, improved use of social networking and increased publicity of all sorts.

Each goal is explained and supported, followed by a framework of objectives and action points for the goal's accomplishment. The adopted plan fits well with my personal passion for maximizing our resources in educating others about the role of indigenous species in maintaining healthy ecosystems, broadening our ranks to include more youth and young adults, and collaborating with like-minded others.

I want to give special recognition and sincere thanks to Wendy Ford. Wendy took the skeleton plan and put meat on those bones. The practicality of the Strategic Plan is a testament to her sacrificial investment of intelligent energy.

The Strategic Plan is a living document, revisable as the need arises. This is an important and exciting step for our Society.



*There are no passengers on
Spaceship Earth. We are all
crew.*

– Marshall McLuhan

Holiday Park

Continued from page 4

also hope that other parks publish similar guides. If an author doesn't have a database of more than 19 years of observation to start with, like Norma Wallman did, perhaps a synergy can arise between the author and the INPAWS Native Plant Wizard patch program. The children's notebooks could help the author's research. In any case, an attractive, easy-to-use, all-inclusive, scientifically accurate guide can only be an asset to a particular natural location.

Wildflowers of Holliday Park is available at INPAWS events and at the following Indianapolis locations: Holliday Park, the Indiana History Center, the Castleton area Wild Birds Unlimited, Kids Ink, and Indy Reads.

Amy Perry, a retired editor, is Recording Secretary of INPAWS Central Chapter. She is in the process of becoming a DNR-trained Tree Steward.

The Good, the Bad and the Beautiful Schramm Woods

By Sue Arnold

The native plant gods smiled down on Hancock County April 19, and 32 hikers had a wonderful warm spring day to enjoy the 31 acres of woods donated to DNR's Division of Nature Preserves by Armin and Dorothy Schramm in 1999.

We were met by preserve guides Mary Ann and Dave Wietbrock and joined by members of Hancock County Master Gardeners, Joe Whitfield of Greenfield Parks staff, and local Central Indiana Land Trust volunteers.

Several local residents, including Russ Sass and Bob Degitz, have labored on trails, removing fencing and invasives from this old hog farm and cataloging the many wetland trees and wildflowers.

Hike leader Marc Woernle, INPAWS Central Chapter president, handed out helpful Schramm Woods spring wildflower plant lists. (There is also a nature hike guide at the site.) Marc was joined by fellow Cardno JFN New botanist Ben Hess in identifying wildflowers, trees and some of those pesky invasives. We followed a 0.6-mile loop through this National Wildlife Habitat and Certified Forest.

Two hours sped by as the bark and buds of basswood, elm and hickory were compared in between flower sightings. We sniffed roots and bark (spicebush, for example) and explored.

We learned what plants look like before they mature or bloom. It is good to know what invasive dame's rocket and garlic mustard look like before they flower, seed and spread evil.

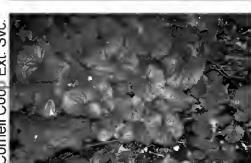
Mayapple, Dutchman's breeches, spring beauty, cut-leaf toothwort, dog-tooth violet, Jack-in-the-pulpit and many other natives were blooming. A bonus was yellow trout lilies, back-lit in the sun, at the base of a deserted rusty combine with trees growing up through it.

Migrating warblers joined us in the woods to make the day perfect.

Sue Arnold is a member of the INPAWS Central Chapter.

Hikes

Cornell Coop Ext Svc.



While anytime is a good time to eradicate invasive garlic mustard, pulling the rosettes in early spring of their first year is a good way to prevent the development of thousands of seeds.

Trees

Continued from page 1

grow deep enough to be close to a properly buried sewer line. The roots do not enter the pipe unless it is defective. Once the clay tiled pipe cracks, breaks and leaks, due to earth tremors and soil settling, water and nutrients are released into the surrounding soil attracting the roots into the pipe defect.

Myth #2: Roots surface and damage lawnmowers. Roots are sometimes forced to the surface by shallow rocks and high water tables. Most of the trouble begins with construction activity that disregards the needs of trees. Poor soil excavated for foundations and basements is spread on the future lawn surface and then covered with a thin layer of top soil. This gets further compacted by foot traffic and repeated mowing – erosion follows. Also, excessive raking of leaves, twigs, fruits, flowers and other natural debris prevents new soil from building that normally would cover the roots.

Trees have been found to nurture their saplings with nutrients through their root systems. Trees communicate to each other by chemical codes. When one tree is attacked by an insect munching on its leaves, it releases a chemical into the air that is picked up by other trees of the same species. They in turn produce a chemical in their leaves that makes them less palatable to the insects. This chemical can also be picked up by predators of the harmful insects, increasing their chances of being eaten.

Whether you're into brilliant fall colors, summer breezes blowing through the leaves on a sunny day, the beautiful spring flowers of redbud, buckeye or dogwood, or the bare branches on bare trunks standing stoically through the swirling snows, please remember trees offer gifts to us daily with long open arms. Now draw a breath of clean air and raise your glass as you glance up at the trees. *Salud!*

Holly Faust is an interpreter with Hamilton County Parks & Recreation at Cool Creek Nature Center, Carmel. She is a member of INPAWS Central Chapter.

A Forest in the City

Wesselman Woods

By Kathy Eicher

It was an exercise in irony: necks craning to the tops of 100-foot tulip poplar trees, then down to the forest floor to gaze at delicate spring beauties (*Claytonia virginica*) and yellow violets (*Viola pubescens*). Mike Homoya led some 25 participants on an April 12 hike at Wesselman Woods Nature Preserve in Evansville.

The group tried to take in the magnificence of this 200-acre old growth forest while concentrating on identifying spring ephemerals along the paths—the stated purpose of the hike co-sponsored by the IDNR Division of Nature Preserves and INPAWS.

Susan Haislip, director of operations at Wesselman, carried a copy of the 1989 survey compiled by Thomas Westfall, who recorded over 300 species of wildflowers in 56 families in approximately one square mile.

By mid-April, spring would usually have presented an array of wildflowers in this preserve to form an impressive checklist. This year consistent cool temperatures, as experienced through most of the country, delayed the emergence of the spring ephemerals.

Many were still in tight bud, such as dwarf larkspur (*Delphinium tricorne*), Jacob's ladder (*Polemonium reptans*), May-apple (*Podophyllum peltatum*), and dwarf crested iris (*Iris cristata*).

Virginia bluebells (*Mertensia virginica*), cut-leaf toothwort (*Dentaria laciniata*), and large-flowered bellwort (*Uvularia grandiflora*), nonetheless, provided diverse color and form and hints of this preserve's amazing display that is sure to come. Wild blue phlox (*Phlox divaricata*) would open after a few more warm days, and prairie trilliums (*Trillium recurvatum*) were well on their way.

Mike showed us the pleated, dark green leaves of crane-fly orchid (*Tipularia discolor*), which was still holding on to its dried flower stalk and empty seed capsules. The leaves will break down and disappear completely before the plant sends up its one-foot flower spike of small greenish-brown blooms in July.

The seemingly dominant understory tree, pawpaw (*Asimina triloba*), was in bud. Mike noted that pawpaw trees form fruit after pollination by certain flies that are drawn to the

flowers' odor of rotten meat or fruit. Crush the leaves of the pawpaw, he said, and the "scent" is that of diesel fuel. How a smelly tree produces such a sweet fruit is a wonder of nature. *Asimina triloba* is also the host food plant for larvae of the outrageously stunning zebra swallowtail butterfly.

The dominant understory shrub, American spicebush (*Lindera benzoin*), noted for its fragrant leaves and berries, was still in bloom.

Back on the forest floor, we saw the state-endangered, ocean-blue phacelia (*Phacelia ranunculacea*), not yet in bloom. It will produce small, pale blue-violet flowers just 1/8" across in mid- to late April.

The finale of the hike was the native wildflower display garden in front of the nature center, alive with the blue and yellow of Virginia bluebells and celandine (or wood) poppies (*Stylophorum diphyllum*).

On your next visit to southern Indiana, don't miss the opportunity to hike Wesselman Woods, a unique "island forest" in the middle of Evansville. The history of the property, which includes the abandoned remnant of the Wabash-Erie Canal, only enhances the experience of hiking trails canopied by 200-year-old giants.

Kathy Eicher is vice president of the Southwest Chapter of INPAWS.



Barbara Homoya

Mike Homoya leads an April 12 hike at Wesselman Woods.



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Nature Preserve Hikes

Indiana Division of Nature Preserves will co-sponsor several hikes in the coming months. Participation is free, but registration is required at www.in.gov/dnr/naturepreserve.

Date	Preserve	County	Co-sponsor
July 12	Conrad Savanna	Newton	INPAWS
Aug. 23	Liverpool	Lake	INPAWS
Sept. 20	Coal Hollow	Parke	Friends of Turkey Run
Sept. 27	Seidner Dune/Swale	Lake	Shirley Heinz Land Trust
Oct. 11	Blossom Hollow	Johnson	Central Ind. Land Trust



inpaws journal

Indiana Native Plant and Wildflower Society

Fall 2014

Kudzu in Indiana? You bet!

By Ken Cote

Yes, believe it or not, kudzu is well-established in Indiana. The Indiana Department of Natural Resources has documented 159 sites in 39

counties, totaling 153.98 acres. Most sites are south of Interstate 70, but there are sites as far north as La Porte County. Sixty-seven percent of the sites are less than one acre, but some are as large as eight acres.

The kudzu in Indiana is adapted to cold weather. Some sites have been here for 50 years and survived the snowy winters of 1977 and 1978. The recent severe winter had little effect on kudzu sites in the state. Spring inspection of a site in Greene County revealed that the large vines above the snow cover were unharmed by the cold.

Identification

Kudzu is a woody perennial vine with a compound, trifoliate leaf similar to soybean. The leaflets can have a simple margin or be lobed; leaves can be up to 12 inches across. Young stems have a light brown pubescence, or downy fuzz, that tends to disappear with age. Older stems can be up to five inches in diameter, light brown with small lenticels (pore-like openings that allow exchange of gases between the air



and inner plant tissues). Kudzu does not really have a fall color and leaves remain green until temperatures drop to 28° F. Brown leaves tend to hang on the plant until January.

Kudzu can look similar to greenbrier, wild grape, hog peanut, moonseed and bur cucumber. Bur cucumber, greenbrier, moonseed and wild grape have a simple leaf. Hog peanut looks very similar to young kudzu. However, hog peanut leaves are smaller and the pubescence white instead of brown. The flowers of hog pea-

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nut are white to light pink, while kudzu flowers are purple to magenta.

The Threat

Kudzu out-competes native vegetation, causing serious damage to native plant communities, and reduces the recreational use of forest lands. Kudzu may also be a threat to soybean crops because it is closely related and has the ability to harbor soybean pests and diseases.

Two soybean pests of concern that can reside in kudzu are soybean rust and the bean plataspid or "kudzu bug" (*Megacopta cribraria*). Soybean rust (*Phakopsora pachyrhizi*), a fungal disease, cannot overwinter in Indiana, but could reside in kudzu during the growing season. The kudzu bug is a tiny brown pill-shaped bug that feeds heavily on kudzu, but can also feed on

Kudzu – continued on page 3

Report IN!

Invasives app launched

By Ellen Jacquart

I found it. Three words you don't like to say when searching for non-native invasive species.

That was the message communicated by Nate Simons, executive director of Blue Heron Ministries, Angola, when he discovered invasive black swallowwort (*Cynanchum louiseae*, also

known as dog-strangling vine) in the Pigeon River area of northeastern Indiana. But this time Nate was able to input his discovery into an app on his smartphone, where it was added to a database

that will help conservation professionals react quickly and effectively to eradicate the invader.

The new system is called Report IN, and conservation groups are hopeful that it will help land managers fight invasive species in Indiana.

Got Asian bush honeysuckle in your back yard? Report IN! See a patch of garlic mustard at a state park? Report IN! The more reports received, the better handle groups will have on which invasives are where - and where they are not. This will help The Nature Conservancy and other groups focus resources where they are needed most.

For an invasive species such as black swallowwort – only spotted in two other sites in the entire state – being able to eradicate it before it has a chance to become established is the most efficient way of combatting it. So with a quick input on his phone, Nate helped prevent black swallowwort from getting a stranglehold in Indiana.

Folks can get started by visiting [www.EDDMapS.org/indiana](http://EDDMapS.org/indiana). Once an account is created (it's free), Hoosiers can start mapping the invasive plants they see.

To make reports from your smartphone, download the Great Lakes Early Detection Network app (just search in your app store for 'GLEDN') and you'll have an easy way to report invasives

... with a quick input on his phone, Nate helped prevent black swallowwort from getting a stranglehold in Indiana.

in the field. All information is shared between the Report IN website and the GLEDN app, so you can use the same EDDMaps profile for both.

A Web Ex training on using the system will be held in January. E-mail ejacquart@tnc.org to sign up for training.

Ellen Jacquart is director of northern Indiana stewardship for The Nature Conservancy and chair of the INPAWS invasives education committee.



Invasive black swallowwort (*Cynanchum louiseae*) is also known as dog-strangling vine.



Brown County invasives effort seeks volunteers

A cooperative effort to rid Brown County State Park and other large properties in the county of invasive species is inviting volunteers to join the fight.

The collaboration includes Brown County Native Woodlands Project (bcnwp.org), DNR's Parks and Reservoirs Division (in.gov/dnr), and The Nature Conservancy (tnc.org). Friends of Brown County State Park, Habitat Solutions, Hoosier Mountain Bike Association, and other volunteers have participated in the campaign.

2014 is the fifth year of the coalition's struggle to eliminate Japanese stilt grass, multiflora rose, Japanese barberry, autumn olive, privet, vinca and bush honeysuckle. Herbicide sprayers and pruners are used, and terrain varies from roadsides to rugged trails and creek beds.

Small groups of six or fewer are usually scheduled to work on weekday mornings, but sessions can be arranged on evenings or Saturday mornings. Those who wish to volunteer may send an e-mail to CR91LJL@aol.com to find out about scheduled work sessions.

Kudzu!

continued from page 1

soybeans and cause significant crop damage.

The kudzu bug was first discovered in Georgia, but continues to spread north and westward. In early 2014, it was located in southeastern Kentucky. There is a high probability that we will see this pest in Indiana soon. The exact effect it will have on Indiana soybeans is not 100% clear. Unfortunately, this insect pest causes little damage to the kudzu plant. The Indiana DNR Division of Entomology and Plant Pathology (DEPP) was watching for this insect while working at kudzu locations this summer.

Site Treatments

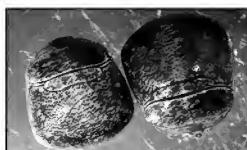
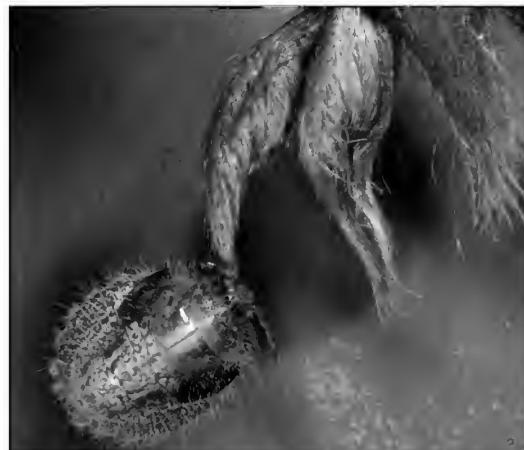
The DEPP is working to control kudzu in Indiana. We are working with landowners to treat kudzu on their properties in order to reduce population levels to a more easily manageable size. Sites are being treated in a north to south manner in an effort to push kudzu populations back towards the Ohio River. Small sites are treated first to prevent them spreading and becoming costly to control. Other factors for site selection include equipment accessibility and proximity to water.

Currently, 57% of the kudzu acreage in Indiana is being treated. Ten percent of the total kudzu acreage is being treated by private landowners, one percent by other DNR divisions on state properties. In the last eight years, Indiana DNR DEPP has treated 71.5 acres of kudzu. This is 46% of the acreage in the state.

Herbicide treatments are the primary tool utilized by DNR to suppress kudzu. Clopyralid, glyphosate, triclopyr and metsulfuron methyl are the active ingredients currently used in the suppression program.

Unfortunately, many biological control options have a high potential for negative impact on soybeans; therefore, they cannot be used. Research is being conducted on biological control of kudzu, but biological products are not readily available on the market. Mechanical control such as crown removal and frequent mowing can work for small sites, but these methods are not practical for large sites.

Eradication of kudzu is extremely difficult and in some cases may not be possible. Seventy-two percent of the sites treated by DEPP have been 90% suppressed. This typically occurs after three consecutive years of treatment. In some cases it may take five years. After five years, sites are allowed to fallow for two years, and spot treatments are conducted to make sure the kudzu does not regrow. Kudzu can develop an herbicide-induced dormancy that can last for years. Therefore, it is essential that sites be monitored even after it appears that all the kudzu has been eliminated. One missed plant can become a 50-foot vine in



The kudzu bug (*Megacopta cribraria*) is a tiny brown pill-shaped bug that feeds heavily on kudzu (leaves at left), but can also feed on soybeans and cause significant crop damage.

just a few years.

Kudzu is a serious problem in Indiana. We continue to treat as many sites as we can with the financial resources available. If you see a kudzu site, please report it to me at DNR DEPP, kcote@dnri.in.gov. You can also call 1-866-NO EXOTIC to report kudzu as well as exotic, invasive insect pests. If you are interested in helping monitor treated kudzu sites, please contact the DNR.

Ken Cote is nursery inspector for DNR's Division of Entomology and Plant Pathology.

Butterfly host workshop

Inviting life into our spaces

By Amanda Smith

On July 19 INPAWS members were among 35 people who visited Strawtown Koteewi Park in Hamilton County for a butterfly host plant workshop.

The group began inside Taylor Center of Natural History, where I gave them a brief overview of the property. At 750 acres, Strawtown Koteewi Park is the largest park in Hamilton County, with 300+ acres of restored tall-grass prairie. I explained the park's interesting natural history and my personal motivation in studying Lepidoptera host plants.

I've come to appreciate native plants not just for their charming beauty and low-maintenance needs, but also for their historical uses and for the life they support. When we plant natives, we are taking an ecosystem approach to gardening.

We are investing in the food chain and inviting life into our spaces.

With that pep talk behind them, the group headed outside. They barely covered the eight miles of trails in the park because at every glance there were native plants to discuss. Participants found themselves in the midst of visually impressive plants like prairie dock which reaches 10 feet tall, as I crouched down to point out more common species like common ragweed, little bluestem, and Canada goldenrod.

When discussing what life native plants support, you must consider more than beauty, stature, and rarity. Common ragweed



Common ragweed (top) supports 46 species of moths and butterflies including the gorgone checkerspot (middle), explained Amanda Smith, shown here with a freshly emerged monarch butterfly.



supports 46 native species of moth and butterflies, including the gorgone checkerspot. Little bluestem supports six species of moths and butterflies.

Goldenrod truly takes the gold for prairie host species. This genus hosts over 100 spe-

The challenge is to look at our plants more holistically and say, "YES! Something is eating my plants!"

cies of Lepidoptera! These are only the moth and butterfly species these plants support. Goldenrod, like the other plants mentioned, are depended upon by spiders, wasps, flies, beetles, birds, and more throughout the year.

Other notable species we encountered in the prairie include white wild indigo, which supports 17 species, and black-eyed Susan, which supports 16 Lepidoptera.

The group made their way toward the park forests and continued tallying host species. Trees are often overlooked in their importance as hosts for moths and butterflies. The showy and beloved silkworm family of moths, which includes polyphemus, cercopia, and luna, host on oaks, maples, hackberry and walnut, to name a few. Collectively, those trees host over 1,000 species of moth and butterflies!

Pokeweed hosts seven species, poison ivy 15, and stinging nettle 35, proving that even less desirable natives have value.

When we understand how critical native plants are to insects and how crucial insects are to birds, amphibians, and up the food chain, we start to see the larger benefits of planting natives. All too often gardeners say, "OH, NO! Something is eating my plants!" The challenge is to look at our plants more holistically and say, "YES! Something is eating my plants!"

Amanda Smith is superintendent of natural resources and education for Hamilton County Parks and Recreation.

Former sand mine now home to rare plants

By Katharine Hadow Ploense

The sheen on the standing water at the Liverpool Nature Preserve isn't pollution from the nearby steel mills. Nor is it leakage from ATVs in the adjacent right-of-way under the power lines. It's a by-product of decomposing vegetation.

The preserve lies in an urban area four miles south of Lake Michigan, eleven miles from northwest Indiana's refineries. At some point in the 20th century it was a sand mine. Since then the moist acidic sand has begun to re-vegetate with a number of rare plants including orchids, sundews, and carpets of club mosses.

Feet got wet at INPAWS's August 23 nature hike at Liverpool; there are no trails through the preserve's marsh. Without galoshes, 11 hikers picked their way from tussock to tussock to see meadow beauties (*Rhexia virginica*), black-fruited spikerush (*Eleocharis melanocarpa*), and endangered globe beakrush (*Rhynchospora recognita*).

In rubber boots, Division of Nature Preserves coastal regional ecologist Derek Nimetz described the preserve's 18 acres: sand savanna along the western edge, grading into open prairie, then moist sedge meadow and marsh to the east.

Also sensibly shod, Nimetz's 12-year-old son Dylan looked for salamanders. Finding none, he spotted weevils in the pod of a cream wild-indigo (*Baptisia leucophaea*) and a praying mantis. The group photographed viceroy butterflies, eastern tailed blues and a sphinx moth.

Two aggressive invaders threaten the preserve: phragmites and ATVs.

Nimetz manages common reed (*Phragmites australis*) by the "snip and drip" method, cutting open the reeds and dripping herbicide into their cut stems. This method protects the nearby plants such as a threatened sand-heather (*Hudsonia tomentosa*) and the rare shining ladies' tresses (*Spiranthes lucida*).

Yet the preserve lies right next to an ATV trail. In only a few hours, joyriders who want to "get muddy" can lay waste to days of selective "snipping and dripping" and years of protection. The public is welcome to visit – on foot – year-round.

To find Liverpool Nature Preserve, take I-65

to exit 258 in Lake Station. Turn right (east) onto 37th Ave., north (left) onto Liverpool Rd., right (east) on Engelhart St. Follow Engelhart to Arizona St. and turn left (north). Park on Arizona and leave a note on your dashboard so the



Meadow-beauty has an urn-shaped fruit that Thoreau compared to a tiny cream pitcher. At left, Derek Nimetz shows the runner of phragmites.

neighbors know you're enjoying the wildlife.

If you forget your boots, your feet may get wet. You'll be glad to know that the water's clean.

Katharine Hadow Ploense is an INPAWS member, a freelance writer and former public information director at Reeves-Reed Arboretum in Summit, NJ.

Dogged Botanizing

Is that your final answer?

By Patricia Happel Cornwell

The summer 2011 issue of the INPAWS Journal carried an article I wrote called "Native Silverberry – or Evil Twin?" It described my research into the Elaeagnus family as I tried to identify a big, fragrant flowering shrub in my front field. It was eight feet tall, with crinkled leaves that were green above, silvery below. In May it bore creamy tubular blooms that smelled like my grandmother's perfume.

I hoped I had native silverberry, *Elaeagnus commutata*, not one of its invasive "evil twins", *E. umbellata* (autumn olive) or *E. angustifolia* (Russian olive). Those Asian species provide

nesting sites and food for birds and mammals, but also propagate extravagantly via their berries, the seeds of which birds obligingly distribute far and wide. I ruled out Russian olive because its leaves are narrower and willow-like. That left two possibilities, one good, one "evil."

I could not come to a definite conclusion because the berries would not appear until after the journal came out that summer. I needed to know if the berries would be silver or red. Silver was good. Red was bad.

I missed the berries that year and the next because we travel a lot. Every year, by the time I remembered to look, the birds had picked the bush clean. Another puzzling factor was that I found no thorns on my bush, which would suggest native silverberry. I remained hopeful.

Fast-forward to 2014. Because we did not mow last year, a second identical bush appeared in the top of the field 700 feet from the original. It had the same leaves and growth habit. I didn't catch either bush in bloom in May, but in early August I discovered the smaller bush full of small, ovoid silver berries. This was promising.

A week later I crossed my fingers and checked the smaller bush again. Now the fruits were juicy, speckled and ... red. Because I was able to wade into the middle of this bush, I finally saw ... thorns.



Speckled red berries and straight thorns are clues that this is the invasive autumn olive.

The thorns were not what I expected. They were 1 ½ inches long and few and far between, only two or three to a branch. There were none near the leaves and berries, only on bare wood.

In trepidation, I went down the hill to examine the parent bush, which was even larger now and laden with the vines of Japanese honeysuckle and wild grape. It was not, however, laden with berries. I searched several minutes before I found three half-shriveled, speckled red berries. I examined one branch after another, but again did not find anything that looked like a thorn. There was a lot of dead wood, which may explain the dearth of berries and the absence of identifiable thorns.

Nevertheless, those three red berries are the damning evidence: both bushes are autumn olive. So we will cut them to the ground, spray the stumps with herbicide, and watch for suspicious sprouts next year. This case is closed.

Patricia Happel Cornwell is an Indiana Master Naturalist, freelance writer and editor of the INPAWS Journal. She lives in Harrison County.

One host tree not to plant

By Patricia Happel Cornwell

We need to provide host plants for all pollinators, right? Well, not so fast.

Every summer I see brightly patterned, red-black-and-white "beetles" on blooms of ironweed, goldenrod and thistle. These "mosaic" insects are actually ailanthus webworm moths. In flight, they reveal dull brown/black hindwings. They are of the ermine moth family, Yponomeutidae.

This moth (*Atteva aurea*, formerly *Atteva punctella*) is considered native from Florida south to Costa Rica, which is habitat to its original larval hosts, paradise trees (*Simarouba species*). However, once tree-of-heaven (*Ailanthus altissima*) became widely introduced into the US from China, the moth made the "leap" to it as a new host, hence "ailanthus" in the insect's common name.

Tree-of-heaven, though invasive, is still sold in nurseries because of its tolerance of poor soils. It is the inspiration for Betty Smith's novel *A Tree Grows in Brooklyn* because of its ability

Host not to plant – continued on page 11

Columbus high-schoolers study biodiversity hands-on

By Troy Gayman, Jessica

Caldwell, Andrew Larson, et al

The Haw Creek Corridor at Lincoln Park is an outdoor learning laboratory that has been used in numerous scientific explorations for Columbus Signature Academy New Tech High School students. During the 2013-2014 school year, Biology I students conducted a study in the forested area around the "people trail" and creek bank. Students used multiple methods of managing invasive plant species to determine the most efficient method of killing the plants.

The most abundant and damaging invasive species in this area are bush honeysuckle, euonymus, and Japanese honeysuckle. Biology I students at CSA New Tech experimented with three different bush honeysuckle control methods; in the first, glyphosate was applied shortly after leaves and stems were cut. In a second, the plant was dug up (mechanical removal). In a third, the plant was cut to the stump and covered with garbage bags. According to our results, the most effective methods were cutting the leaves and stem of the plant before the application of the herbicide or digging up the entire

Touch the earth, love the earth, honour the earth, her plains, her valleys, her hills, and her seas; rest your spirit in her solitary places.

— Henry Beston

plant.

The students tested three different methods to control euonymus. In one, glyphosate was applied directly to cut stems. In a second, vinegar was applied directly to the leaves. Other plants were dug up. All methods were effective as long as the method was applied to every invasive organism in the area. When any method was used in an area next to more euonymus, the neighboring plants would begin to spread in the area where the methods were used.

In other experiments, students applied glyphosate to Japanese honeysuckle vines and got mixed results. Some students who used the method were successful; others killed the organism but neighboring organisms crept into the vacant area left behind. Others found that the organism was unaffected by the herbicide.

Additionally, the 2013- 2014 AP (Advanced



ioras.edu

Placement) Biology class conducted biodiversity surveys of the area. As tree diversity plays an important role in the long-term stability of an ecosystem, a census of the trees in the Haw Creek corridor along Lincoln Park was conducted. The dominant common native species that we found were hackberry (*Celtis occidentalis*), white ash (*Fraxinus americana*), boxelder (*Acer negundo*), silver maple (*Acer saccharinum*), slippery elm (*Ulmus rubra*), and sycamore (*Platanus occidentalis*).

Native trees found in less abundance were buckeye (*Aesculus glabra*), cottonwood (*Populus deltoides*), honey locust (*Gleditsia triacanthos*), bur oak (*Quercus macrocarpa*),



Students experimented with three different methods to control invasive bush honeysuckle (above) as well as testing ways to attack euonymus and Japanese honeysuckle (top). Students also conducted biodiversity surveys.

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Eco-blitz bliss in state forests

By Steve Dunbar

It's finally raining so I am happy, and so are all the plants I have been listing this summer. The wildflowers now have the needed rain to continue growing to produce seed for future generations, and I have an excuse to stay inside to write this article.

I am a wildflower lister, as a birder may keep a life list of birds (which I also list). In June I had the privilege of helping to identify plants in the back country area of Morgan-Monroe/Yellowwood State Forests for an eco-blitz undertaken by the Indiana Forest Alliance with the aid of other organizations and volunteers. The goal of the project was to inventory the flora and fauna of the area which, for the most part, has not been logged recently and hopefully will not be.

The area includes 800 acres of these south central Indiana state forests, east of Low Gap Road in Monroe and Brown counties. It also includes the 320-acre Low Gap Nature Preserve, which boasts some very large trees, rare plants, and animals of special concern.

One such rare plant which we came across in the preserve was *Gaultheria procumbens* - wintergreen! I had just added this plant to my life list this summer, as I had seen it in bloom at Fall Creek Falls State Park in Tennessee. It is more common in northern Indiana, but this was the first time I had seen it in this region of the state. The plants were only a few inches tall, much smaller than the small shrubs I saw in Tennessee.

I wondered if deer find wintergreen tasty, as the leaf has a wonderful scent. As I crushed a leaf it reminded me of wintergreen gum. We also crushed leaves of dittany, *Cunila origanoides*, whose leaves emit a spicy aroma.

A plant we were hoping to find was large whorled-pogonia, *Isotria verticillata*, an orchid that is rare in this neck of the woods. One leaf we came across was a possibility, but insufficient evidence for a positive ID. Maybe I'll get to add it to my life list some day.

It was great fun to learn and share the

names of plants and their niches in the ecosystem. We came across a pipevine swallowtail larva on its host plant, Virginia snakeroot, *Aristolochia serpentaria*, that had a bloom nestled in the leaves at the base of the plant. A harvester butterfly gracefully landed on me as I walked along the beautiful creek bottom. A gray petal-tail dragonfly landed on a log, posing for a picture as I zoomed in on it. We saw fluorescent orange mushrooms and cool-looking earth star fungus.

An oak beauty moth landed on a nearby tree and posed for a photo. It is one of the 500+ moths I have seen at my porch light at the back of my house, which faces a section of Morgan-Monroe State Forest, but this one had more contrast in its black and white mottled markings.

These are just a few highlights of our scouting amidst the grandeur of huge trees and glimpses of warblers, tanagers and flycatchers. If you have never been to this part of Morgan-Monroe/Yellowwood State Forests I encourage you to hike this back country area. It has a lot to offer.

The rain has stopped, so it's time to take a walk with the dog and try to add something to my life and/or yard list. Yesterday it was a blooming round-leaved tick-trefoil, *Desmodium rotundifolium*, on my septic field and a eupatorium borer (*Carmenta bassiformis*) on the black-eyed Susans. What is waiting for me today?

Steve Dunbar is president of the South Central Chapter of INPAWS.



Steve Dunbar

Steve Dunbar thought to turn his camera upward in the Low Gap Nature Preserve during the ecoblitz.

What's the story on understory?

By Patricia Happel Cornwell

I live in the boondocks in south central Indiana, and I've been noticing an increase in a landscaping practice that bugs me. As I drive through the countryside, I see patches of woods adjacent to lawns that are being methodically cleared, all but the trees.

This creates a park-like effect, but more like an inner-city park than a state park. The underbrush, vines, saplings, wildflowers, brambles, dead wood, all are piled up and burned, leaving open space under the trees. It looks

so neat, so cared-for. It invites a park bench or a gazing ball.

So what's the problem? Understory.

Understory is the level of plant life that grows beneath the forest canopy. It includes seedlings and saplings of canopy trees, "specialist" understory shrubs such as spicebush and beautyberry, small trees like dogwood, and many smaller herbs, wildflowers, ferns, mosses, lichens, and microorganisms.

Understory plants receive less light than canopy trees so must be shade-tolerant. This habitat allows for higher humidity and cooler temperatures, allowing fungi and other entities to create a nutrient cycle that feeds the soil and enables life for many animals and plants.

Animals rely on the understory of woods and forests for "home, restaurant, shopping districts and highways" (*Encyclopaedia Britannica online*). These species include insects and spiders, snakes, lizards and frogs, field mice, moles, rabbits, raccoons, opossums, skunks, squirrels, birds and - depending on where you live – maybe jaguars, tigers, rhinos or elephants.

The understory produces berries, seeds and nuts to feed birds and animals and provides safe nesting sites and shelter. It sustains a healthy mulch on the forest floor, prevents surface water runoff and erosion, and breaks down to create a deep layer of rich topsoil.

What looks tidy to us humans is inhospitable to other species. Forest habitat is increasingly fragmented across the country, thanks to residential and industrial development. One might expect that less of this destruction would happen in rural areas, but farmers continue to clear the woody edges of their fields to plant more corn or soy beans, and city folks moving to the country buy a couple of acres and work diligently to replicate a city lot with perfectly edged borders and no messy wild undergrowth.

In my area (I hesitate to say "neighborhood" since I can't actually see any neighbors), the owner of the woods adjoining our woods allows relatives to cut mature trees and clear underbrush every summer. I wince when I hear chain saws. These well-meaning men, just looking for

The clearest way into the universe is through a forest wilderness. —John Muir



Steve Dunbar

During his "eco-blitz" in the back country area of Morgan-Monroe/Yellowwood State Forests (previous page), Steve Dunbar encountered interesting fungi in the understory and spent quality time with this harvester butterfly.

some free income, have no idea of the complex society of species underfoot.

"The shrubby layer and density is disappearing from forests around the country," according to a blog called "Garden Walk Garden Talk." "Why? The shrubs and thickets are a detriment to forest timber cutting and are often cleared."

It's not all human interference. Whitetail deer, too, are destroying understory by over-browsing. Deer are unlikely to change their habits, but humans are capable of understanding our impact on the life around us.

Often I hear remarks like "When I was a kid there were a lot more rabbits in the woods" or "I can't remember the last time I heard a whip-poorwill."

Gee, I wonder why?



Why Tree Ordinances?

By Tiffany Arp

Communities are beginning to recognize the many tangible benefits that trees provide in the urban environment. Healthy trees reduce air and noise pollution, provide energy-saving shade and cooling, are habitat for urban wildlife, enhance aesthetics and property values, encourage economic development, and are an important contributor to community image, pride, and quality of life. This has led many communities to realize the importance of protecting their urban trees.

Tree ordinances are among the tools used by communities to attain and maintain a healthy, vibrant, well-managed community forest.

Tree ordinances fit into one of three basic categories (ISA Tree Ordinance Guidelines, 2014):

Street tree ordinances primarily cover the planting and removal of trees within public rights-of-way. They often contain provisions governing maintenance or removal of private trees which pose a hazard to the traveling public. Also in this category are ordinances with tree planting requirements, such as those along streets and in new development areas.

Tree protection ordinances are primarily directed at providing protection for native trees or those with historical significance. They usually require a permit before protected trees can be removed, encroached upon, or in some cases, pruned.

View ordinances are designed to help resolve conflicts between property owners that result when trees block views or sunlight.

Ordinances provide an opportunity to set good policy and back it with the force of law when necessary. A tree ordinance should designate an individual or group within the community to look after and manage the urban forest. This person or group would be responsible for writing and implementing an annual community forestry work plan. Ideally, the plan will provide guidance for planting, maintaining and removing trees from streets, parks, and other public places (Arbor Day Foundation, Tree City USA Standard #2). However, the ordinance should be flexible enough to fit the needs of the community.

One section every ordinance should contain is a "do not plant" list of tree species identified by the

community as inappropriate and that shall not be used for planting along streets and other public areas. This is the place to list tree species that should never be planted.

Trees that should be on every community's "do not plant" list include ash, ailanthus (tree of heaven) and pear (*Pyrus* species). Many communities also ban cottonwood, box elder, silver maple, Siberian elm and female gingko as trees not to be planted along urban streets.

The ultimate goal of a tree ordinance is to prevent a net loss of trees in the community and to protect existing trees. To discuss creating a tree ordinance for your community, contact DNR Community and Urban Forestry at (317) 234-4386 or urbanforestry@dnr.in.gov.

Tiffany Arp is community and urban forestry coordinator with the DNR Division of Forestry.

Host not to plant

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to persevere and thrive even in harsh conditions. Inspirational or not, it is destructive of any habitat, urban or natural. In cities, it breaks up foundations and sidewalks. In natural areas, it outcompetes native species. Tree-of-heaven is present in 83 of Indiana's 92 counties.

Ailanthus webworm moths cannot survive cold winters. They migrate north every summer throughout the continental US and eastern Canada. Its larvae pull a few leaflets around a mesh of loose webbing (hence, "webworm"), then eat the leaves. The caterpillars have white and green stripes. The adult moth feeds on and pollinates flowers.

Why are these moths so numerous in my fallow field when the nearest tree-of-heaven is five miles away along a state highway? These trees bear large clusters of flowers and winged fruits, whose seeds are dispersed far and wide by wind in late winter.

So while we native plant lovers strive earnestly to provide host plants for insects and other creatures in the chain of life, this is one insect whose host is unwelcome. Unfortunately, we need not fear that the ailanthus webworm moth will disappear from our summer landscape any time soon, as long as nurseries continue to sell invasive tree-of-heaven and the winter wind continues to blow.



Collaboration creates a rain garden

INPAWS In Action

A July 12 workshop at the Mulberry Community Library in Clinton County capped a two-year endeavor that combined the resources and expertise of numerous public and private entities to create a demonstration rain garden. A \$1,000 INPAWS grant, along with gifts from nearly a dozen organizations and several individuals, helped turn a water detention basin into an ecological and educational boon.



Kevin Tungeswick, restoration ecologist with Spence Restoration Nursery, Muncie, and Ben Reinhart, resource conservation specialist with Clinton County Soil and Water Conservation District (SWCD), Frankfort, spoke at the free event.



Volunteers planted this rain garden at an Indianapolis condominium in 2011 (top) and recently celebrated its third birthday

mowing ordinances.

The clay soil was amended and a broken tile discovered and repaired. An underground drain and new standpipe were added so the pond would drain within 24 to 48 hours. A landscape cloth cover was constructed to prevent mulch from obstructing the drain.

Community volunteers and four Sheriff's Department inmate volunteers added 20

yards of leaf compost, which was incorporated into the soil with a tiller, and then topped the amended soil with 20 yards of mulch.

In August, 2013, native plants, purchased with funds from INPAWS and Clinton County Community Foundation, were planted on a grid laid out by members of Clinton County Soil and Water Drainage Board. Twenty volunteers planted 1,300 plugs in two and one-half hours. Later, library staff planted turf grass seed and watered through the fall.

The rain garden has successfully drained within 24 to 48 hours after major rains, and the native plants had a successful survival rate for their first year. Plantings continue to be maintained by SWCD and library staff. A brochure and educational signs have been developed to explain to the public how a rain garden works and to identify the native species used. 

Indy rain garden comes of age

A rain garden got a party for its third birthday when 30 people gathered Aug. 21 at Timbers condominiums in Indianapolis for a cook-out, complete with birthday cake.

The rain garden (left) was developed in 2011 by the Timbers of Indianapolis condominiums and the Central Indiana Watershed Foundation, in part with a \$500 grant from INPAWS.

Daryn Fair, president of Fall Creek Land Design, provided guidance and donated plants and design work. The volunteer labor was done by Timbers residents and maintenance crew, with help from University of Indianapolis ecology students (top left).

A few plants were lost last winter so some replanting will need to be done next spring, but the garden is considered mature at age three.

Hendricks gardeners to host Oct. 4 event

Hendricks County Master Gardeners will host "Adventures in Gardening" Oct. 4 from 9 a.m. to 4 p.m. at Hendricks County 4-H Fairgrounds.

The \$45 registration fee includes continental breakfast and lunch.

The featured speaker will be Stephanie Cohen, QVC-TV's "Perennial Diva" and founder and director of the Landscape Arboretum at Temple University. She is a contributing editor to HGTV Newsletter's "Fine Gardening" column.

Other speakers include Jerod Chew of Marion County Soil and Water Conservation District and Bill Fielding, roadside services coordinator for Indiana Dept. of Transportation.

For further information, see <http://hendricksgardeners.com> or contact Chase Stanley at 317-745-9260.



Hands-on

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and black walnut (*Juglans nigra*).

Other woody invasive species, in addition to those mentioned earlier, were catalogued, including white mulberry (*Morus alba*) and tree-of-heaven (*Ailanthus altissima*). By far, bush honeysuckle and euonymus are the woody species that seem to pose the greatest threat to this area.

The long-term goal for this area is the reestablishment of a native plant community by using a variety of control methods, gradually and consistently, to eradicate invasive plants. Doing so will benefit the natural ecosystem and the community of Columbus as a whole.

Troy Gayman (Class of 2017) and Jessica Caldwell (Class of 2014) are students at Columbus Signature Academy New Tech High School where Andrew Larson is the Biology Facilitator.

Oct. 11 Hike

The Indiana Division of Nature Preserves is co-sponsoring a hike in Blossom Hollow Nature Preserve in Johnson County. The hike is cosponsored by the Central Ind. Land Trust. Participation is free, but registration is required at www.in.gov/dnr/naturepreserve.

Hikes



During an INPAWS hike at the Liverpool Nature Preserve, Derek Nimetz's son Dylan, 12, spotted weevils in the pod of a cream wild-indigo (*Baptisia leucophaea*).

Forbidden Fen

By Amy Perry

Twenty-some people gathered in a Mounds State Park parking lot at woods' edge on the hot afternoon of June 8. The Central Indiana INPAWS Chapter e-mail had promised an education about sedges (which I confess I was hoping would become less intimidating to me) and a foray into the Mounds Fen Nature Preserve.

I was looking forward to seeing the preserve. It is not open to the public; in fact, on the park map it is a blank area. The entire preserve and most of the park are in danger of being flooded to create a proposed reservoir. [Editor's note: See "Dam Poor Idea" by Lee Casebere in the Spring 2014 issue of INPAWS Journal.]

Our leader was Paul Rothrock, recently retired botany professor at Taylor University. We had an

escort, too—a park naturalist who explained that her role was to make sure we stayed on the paths and did not stray into the nature preserve! She seemed surprised when Paul produced his permit to enter the preserve. After a quick cell phone call, she became comfortable with his permit and accompanied us just like another hiker. Because of Paul's permit, she got to see areas from which even she normally is prohibited. Paul did detour us away from certain sections that were too fragile for foot traffic.

Sedges have a three-sided stem (hence "edges" in the mnemonic); leaves are arranged in three ranks along the stem. Their small wind-pollinated flowers, which are unisexual, are found in the axial of a single spike. The male and female flowers may be in the same spike or in different spikes.



newenglandwild.org

Wetland sedges (*Carex* spp.) including porcupine sedge (above), are important food sources for a variety of creatures including sedge grasshoppers, semi-aquatic leaf beetles, billbugs, seed bugs, plant bugs, various aphids, leafhoppers and the larvae of various butterflies and moths. Caryx seeds and seedheads are an important source of food to waterfowl, rails, and some songbirds. Muskrats occasionally eat the rhizomes, culms, and young shoots.

Seventy percent of sedges live in wet areas. (In contrast, 70% of grasses live in dry areas.) A fen is a wetland with alkaline, neutral, or only slightly acid peaty soil.

Although sedges have no colorful blossoms, Paul's practiced eye caught them easily as we walked on the paths through the woods. He showed us the gracefully drooping slender woodland sedge (*Carex digitalis*) and the lily-like Short's sedge (*C. shortiana*, named for the same Short of Short's aster).

We descended past the point that White River will reach if the park is flooded and turned off the path. We kept in single file so as to minimize disturbance to the tall stalks we were pushing aside from our faces and the vegetation we were stepping on. We passed through the fen, a sunny marsh. Now we were using that permit.

A few species seen only in the fen were lake sedge (*C. lacustris*), porcupine sedge (*C. hystericina*), and the dense stools of tussock sedge (*C. stricta*). Wildflowers included great Angelica (*Angelica atropurpurea*), queen of the prairie (*Filipendula rubra*), and marsh thistle (*Cirsium muticum*). We also saw the shrub ninebark (*Physocarpus opulifolius*).

As we started descending to the right, we were unable to avoid squishing into the narrow streams of dark water trickling across our path. I understood then why the e-mail had recommended wearing boots. We reached a flat bottom below the fen—a swamp. The tree canopy was thick, but

enough sunlight filtered through that it seemed not gloomy, but pleasantly mysterious and prehistoric. After inspecting a highly poisonous water hemlock from a safe distance, we headed back up toward the public path.

All in all, Paul pointed out

16 different sedges, 12 of which I may never see again. (At least, they are not available from my usual commercial source of native plants). We also saw at least 42 wildflowers and woody plants. About one-third of these were in bloom, like the fire pink with its red petals standing out against the green wildness of the forest.

Before the hike, Paul had distributed two hand-

Forbidden — continued on next page

Annual Conference

Continued from page 16

Eric Knox – “Designing the Interface for a Digital Flora of Indiana”

Eric will report on efforts to make the 150,000 specimens of the Indiana University Herbarium available online. He will seek input from attendees about what online resources they currently use and how this new database could meet their needs.

Heather Reynolds – “Fruits of the Forest: Restoring Urban Woodlands for Wildlife and People”

The Bloomington Urban Woodlands Project brings campus, community and business together to restore plants that support native wildlife and human well-being. Heather will talk about the successes, challenges and mysteries of urban woodlands and how you can get involved.

Bill Weeks – “The Shaping Intelligence of Nature”

Scott Russell Sanders has written that native plants “give us a chance to glimpse the shaping intelligence of nature, to sense the ultimate mystery from which all things rise, and to align ourselves with that power.” Bill will explore the meaning of those words for this place and time.

Hotel Rates

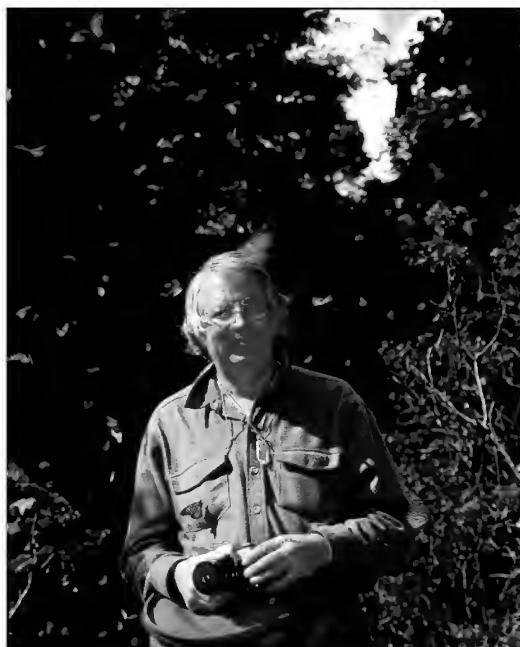
A block of rooms has been reserved at a special conference rate of \$99 at TownePlace Suites by Marriott (105 S. Franklin Road, near SR 37/45 and 3rd St.) Originally, the rooms were to be provided at this rate only until Oct. 3. However, if rooms are still available after that date, INPAWS will attempt to get the special rate extended. If you have not yet booked a room, call TownePlace Suites at 812-334-1234 and mention “INPAWS” to find out if rooms are still available at the conference rate.

Friday Reception

If you are arriving for the Saturday conference on Friday night, or if you live in the Bloomington area, don’t forget the Friday evening reception at 7:30 p.m. at Crazy Horse Food and Drink Emporium, 214 W. Kirkwood Ave., Bloomington, 47404. Everyone is welcome to come and meet

the conference speakers and socialize with other attendees.

Tom Hohman is 2014 INPAWS conference chair, a past president (2010-2011), and head of the Central Chapter’s invasives SWAT team.



Professor Lincoln Brower, an expert on the monarch butterfly will recount some of his experiences doing research in Mexico and his discoveries and insights into the monarchs’ behavior and conservation needs.

Forbidden – from page 14

outs he has written, which were very helpful in preparation of the notes for this article: “Some Carex Species of Central Indiana” and “Key to Some Common Indiana Species of Carex.” During the walk he circulated printouts of the “Rapid Color Guide to Sedges (Carex)”, which is also available free at <http://fm2.fieldmuseum.org/plantguides/guidimages.asp?ID=340>.

I’m grateful for the opportunity to experience a fen, especially one normally forbidden to lay people like me. My degree of intimidation by sedges has diminished greatly. Sedges have great variety and interest and are definitely worth a close look.

Amy Perry is a retired editor, recording secretary of INPAWS, and a member of Central Chapter. Her garden was featured on the INPAWS 2013 Garden Tour. She thanks Norma Wallman and Paul Rothrock for help with this article.

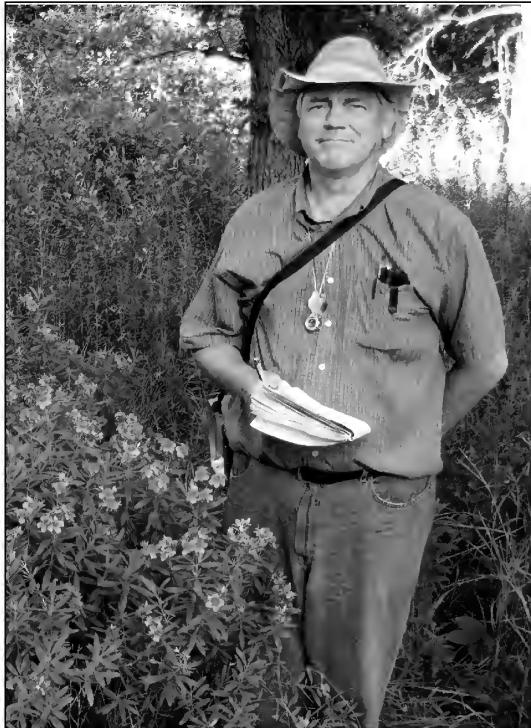


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November 1

INPAWS conference: facing challenges



By Tom Hohman

Time is growing short for those who have not yet signed up for the Nov. 1 INPAWS annual conference. Our 2014 theme is "Embracing Indiana's Conservation Challenges."

The all-day event will take place at Bloomington-Monroe County Convention Center, 302 S. College Ave., Bloomington, 47403. Deadline for early registration is Oct. 15, but it's still a bargain after that. Fees before/after Oct. 15 are: member \$50/\$60, non-member \$65/\$75, student \$30/\$35.

Speakers and Topics

Lincoln Brower – “The Grand Saga of the Monarch Butterfly”

For over 50 years, Professor Brower has been a leading researcher of the monarch butterfly, traveling many times to their overwintering site in Mexico. He will provide accounts of some of these trips and his discoveries and insights into their behavior and conservation needs.

Gerould Wilhelm – “Consilience, Conciinnity, and the Way of the Land”

Jerry Wilhelm will use native prairie, woodland, and riverbank landscapes to illustrate consilience, when all elements of an ecosystem are working in harmony, and conciinnity, the harmony between people and place when humans understand their role in that ecosystem. He will explain why we must learn "the way" of our land and accommodate it as strictly as a pilot must obey the laws of flight.

Ellen Jacquart – “Report Those Invasive Plants! What’s New with Invasive Species in Indiana”

Ellen will report on the new digital reporting system for invasive species in Indiana, and how everyone can get involved. She will also describe the status of efforts to take invasive plants out of the nursery trade.

During one of two keynote talks at this year's annual conference in Bloomington, Gerould Wilhelm will explain why we must accommodate "the way" of our land as strictly as a pilot must obey the laws of flight.

Conference – continued on page 15



inpaws journal

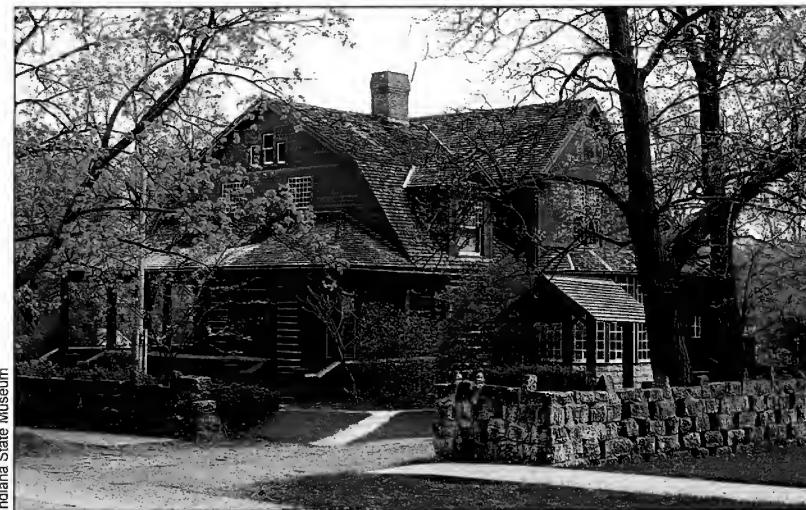
Indiana Native Plant and Wildflower Society

Winter 2015

Land of the Limberlost

By Terri Gorney

"The marsh, that can die and yet return to life in the first breath of spring, seems each year to repeat anew to its lovers," wrote author, naturalist, artist and photographer Gene



Limberlost State Historic Site is the home of Gene Stratton-Porter.

Stratton-Porter in her 1910 book *Music of the Wild*.

Stratton-Porter immortalized the Limberlost Swamp in her novels and nature studies of the early 20th century. For 25 years, she drew inspiration from the swamp and lived at the edge of it in Geneva. By around 1913, the great swamp that was once 13,000 acres had been drained.

Fast-forward to the present. There are now over 1,800 acres of restored wetlands around Geneva owned by the Department of Natural Resources and Friends of the Limberlost. Gene's 14-room Queen Anne style cabin, carriage house and visitor center are now the Limberlost State Historic Site.

The 460-acre Loblolly Marsh has about three miles of walking trails with habitats of prairie, woods and wetlands. On the Adams/Jay

County line is the Limberlost Swamp Wetlands Preserve. This spot is great for birding by car. Seen this year in the area were king rails, least bittern, short-billed dowitchers, black-necked stilts and a number of shorebirds. Other wetland restoration projects include Rainbow Bottom, Munro Nature Preserve, Music of the Wild Preserve and the Bird Sanctuary. Around these sites are interpretive signs that include quotes of Gene Stratton-Porter.

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Ken Brunswick is the man who had the vision over 30 years ago to restore some of the wetlands in areas that were prone to flood, causing loss of crops. In the beginning he ran into opposition, but he slowly won over his detractors. In 1993, he and others founded Limberlost Swamp Remembered, a group that continues to advocate for restoring portions of the original 13,000-acre Limberlost Swamp. In January, 2003, the position of east central regional ecologist was created for Ken by DNR. He held the title until his retirement in December, 2013.

Limberlost naturalist Curt Burnette calls Ken the "Keeper of the Limberlost," a title that is well-deserved. Ken lives in a home that once overlooked flood-prone farmland, but thanks to his tireless efforts his home now overlooks the Loblolly Marsh Wetland Preserve.

Limberlost – continued on page 11

The hidden world

By Amy Perry

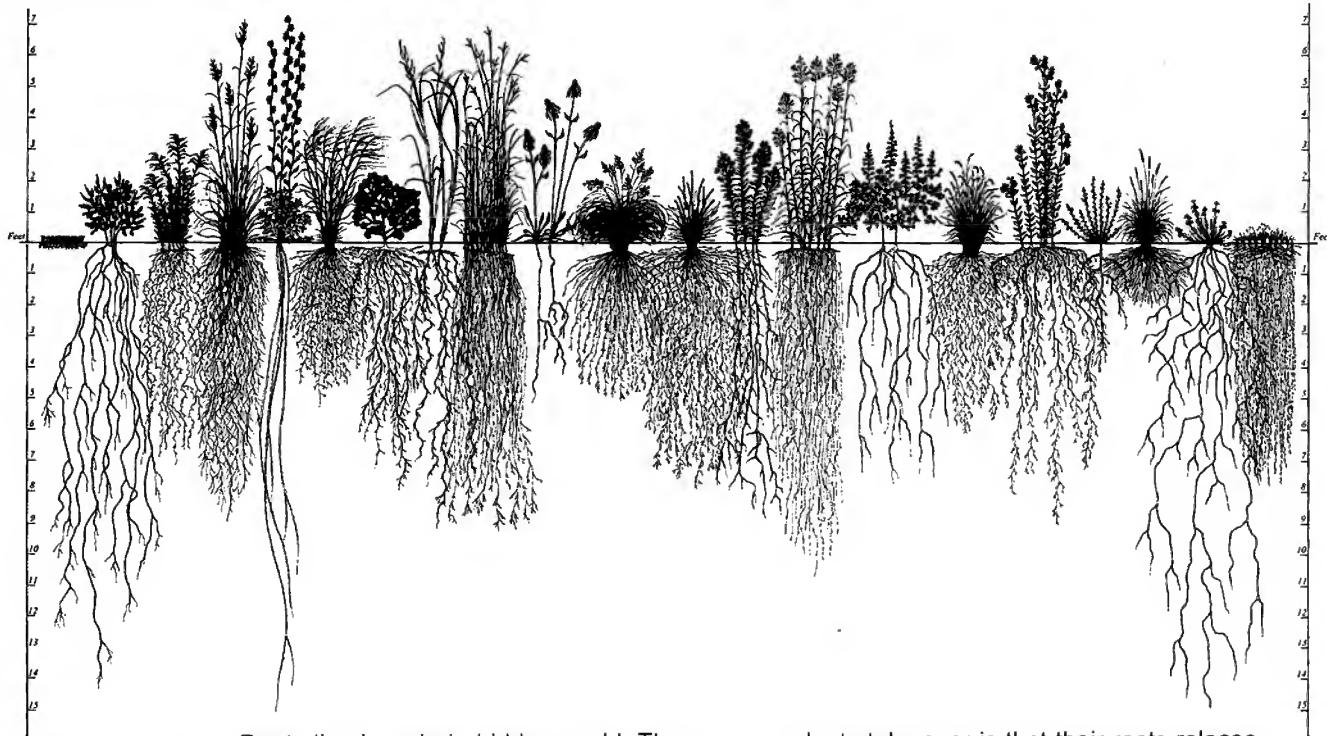


Illustration by Heidi Natura

Roots live in a dark, hidden world. They usually are not used in plant identification (although they're included in herbarium specimens) because they're not visible above the ground. What's going on down there, anyway? A frenzy of feasting, invading, building, sheltering, transforming, transporting, exchanging favors, burrowing, mining, branching, decomposing, and dying.

Roots are multi-taskers extraordinaire. Roots transport nourishment up the stem to the rest of the plant. Young seedlings pour most of their energy into establishing roots so they'll have a dependable source of water and minerals as they grow. Roots support and stabilize the plant. If tree roots grow in circles and don't extend far enough out from the trunk, trees are more likely to be blown over by the wind. Fine roots also help hold variously sized soil particles into aggregates, thus creating passages for water and air to penetrate the soil. One way that invasive

plants take over is that their roots release substances that inhibit growth of other plant species.

Even in death, roots are useful. When they die, they leave channels in the soil. Rain water enters the soil through these, decreasing water runoff and replenishing the water table. The decayed roots supply compostable material for the soil's flora and fauna to digest. The result is humus, which in turn is useful to the plant. For example, earthworms travel through the channels, eat the roots, and in turn help the plant by providing highly nutritious castings. One researcher found that in many trees, the roots provide as much as two tons of compostable material for every 2.5 acres.

The roots of prairie plants especially are nourishing to neighboring plants with different root systems. Fibrous-rooted prairie bunch grasses have fine roots. Throughout the eons they died every three years, creating humus in the soil. This process is the only way to sustain organic

of roots

matter in the soil. A typical midwestern prairie produces three tons of roots for every ton of shoots.

Varieties of roots

Dicots (most broad-leaved flowering trees and plants) have tap roots, a single root growing downward toward gravity. Taproots vary considerably in length and diameter. Pokeweed (*Phytolacca americana*) has a taproot system that can reach 6 inches in diameter.

Monocots (grasses and daffodils, for example) and the many dicots whose taproots stop growing or start to grow slowly, have fibrous roots. All the plants but seven in the book *Weeds of the Midwestern United States and Central Canada* (which treats many wild-flowers as weeds) have roots described as "fibrous."

Some plants have forms that are root-like but not roots. These forms include runners, or stolons, which are above-ground stems, as in strawberries; corms, as in jack-in-the-pulpits; bulbs, as in onions; and rhizomes, which are underground stems, as in irises and ferns.

Some plants grow roots from parts of the plant other than the underground part usually considered the root, such as from a leaf or the stem. These are called adventitious roots. Adventitious roots are useful to gardeners because they enable vegetative propagation, that is, reproduction other than from seeds. A prop root is an adventitious root that arises from the stem, penetrates the soil, and helps support the stem, as in corn. Another type of adventitious root is an aerial root, as in trumpet creeper, poison ivy (which climbs trees with its shaggy roots), and mistletoe (*Phoradendron spp.*), whose root squeezes right through the bark of a tree into the host's sap stream.

Some roots live all their lives in water. Duck-weed (*Lemna minor*) consists of a frond attached to a root, all floating in water. Even mosses have tiny rootlets that grip rock surfaces. The mosses shelter fungi, bacteria, and other organisms that decompose the

rock into soil. Thus these plants help create soil for succeeding plants to use.

Some plants sprout new shoots from their roots, as do paw-paws. Many gardeners propagate certain plants by bending down a stem to the soil, weighing it down, and transplanting it in a few years, after it has put down roots.

Partners of roots

Despite the wondrous variety of types of roots, the most interesting roots are those that form relationships with fungi and with bacteria. Most plant roots form such relationships. These invisible bacterial and fungal functions that take place around the roots (the zone called the *rhizosphere*) sustain the life of the plant. This is why it is important to keep a good amount of surrounding soil on the roots when rescuing or otherwise transplanting a plant.

Roots accept water and minerals from fungi. In turn, roots provide sugars and the energy of sunlight to the fungi. The fungi form networks along roots and line the roots. Together these structures are called mycorrhizae, from *myco* (fungus) and *rhizae* (roots). Fungi have long thin strands that can penetrate deeper into the soil than roots can. They also can absorb phosphorus much better than roots can. The fungal sheath forms a barrier to disease-causing organisms. The fungi use the energy from the plant to produce their fruiting bodies, mushrooms. Mycorrhizal roots of one type are thicker, have more branches, and are longer-lived than non-mycorrhizal roots. The fungi's branches function as root hairs, greatly increasing the roots' surface area and enabling the plant to absorb more nutrients.

Some fungi are connected to multiple plants in the wild; hence all the plants presumably benefit from each others' mycorrhizae. Indian pipe, however, doesn't contribute a thing to the plants it shares fungi with. It has no chlorophyll of its own. It obtains nutrients from a fungus that has obtained them in turn from other plants.

Roots of trees and shrubs also partner with bacteria to form nitrogen-fixing root nodules. This function is essential, because all living

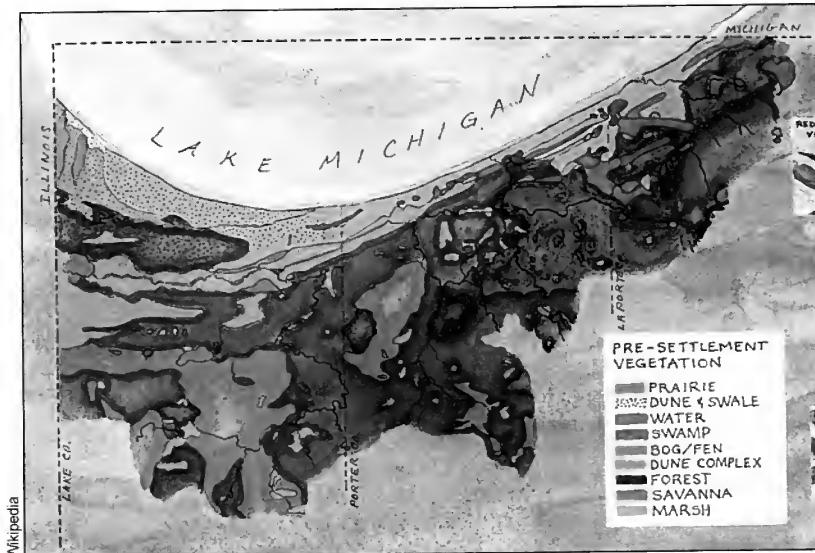
Roots – continued on page 14

Before restoration

By Barbara Plampin

Before habitat restoration comes research. It is necessary to know what an area was like before or at settlement and what affected it thereafter. Such research involves finding written records, old maps and photographs, interviews, site visits, and making new maps.

So instead of identifying sphagnum moss as planned last summer (See *INPAWS*



Wikipedia

Journal, Spring 2014), I helped write the Phase II report on the 800 acres of the Eastern Great Marsh (EGM) in northeast Porter and northwest La Porte counties. Phase II will help the Indiana Dunes National Lakeshore's wetland expert decide what to restore here and how to carry out restoration. Professional geologist David Hamilla was the other author and the map-maker.

My report of Phase I (See *INPAWS Journal*, Winter 2011-2012) discussed EGM's past glories: a tamarack bog, native cranberries, and the 300+ acre Fish Lake, its successors, a commercial cranberry marsh with dams and holding ponds, and a nearby spa and sanatorium, all owned and developed by Michigan City entrepreneur Chauncey Blair, later an important Chicago banker. By 1837, he had acquired 10,000 acres west of Michigan City.

We found that Blair drained his land but could not find the drainage records. We discussed the Indiana State Prison farm, some of it leased from Blair or his heirs.

Phase II also examined Blair's other local business activities in case they affected EGM (they did not). We attempted to find the prison farm leases so as to determine the farm's exact boundaries and acreage and find out more about EGM drainage and structures. We failed to find the effects of re-routing US 12 across EGM in 1934, but did find the precise site of the tamarack bog. Phase II also uncovered pertinent maps.

Phase I research had turned up references to two prison farm leases of Blair land, the first about 1900, the second in 1918. We never found the first lease, and though we never saw the second, we were able to infer its existence and contents from other documents.

The Phase II paper chase for leases took Adam Walker, my researcher/driver, to the La Porte County courthouse vault, a windowless, iron-gated box open four hours a week and to the Porter County recorder's office, windowless, ungated, and open daily. After fruitlessly searching decades of miscellanies for leases, we finally found deeds in the deed books for both counties, recording the 1918 sale of 1,945 acres by a Blair heir to the holding company which then rented the acreage to the prison. These deeds enabled David to determine and map prison farm boundaries.

At the Indiana State Archives, just before closing time, Adam and I turned up an adequate substitute for the 1918 lease, the prison's inquiry into leasing Blair land in the EGM in the handwritten 1910-1919 Record of Proceedings, Board of Control (prison trustees). We got photocopies, but had no time to find the lease itself. Information elsewhere says the lease lasted until 1926, when the legislature told the prison to vacate the farm. In 1927 Robert Bartlett bought the farm and included it in his Beverly Shores development.

The inquiry mentions sandy loam suitable for soy beans and corn, sandy muck, and deep peat suitable for onions, cabbage, and

comes research

timothy. It recommends burning off "wild grass & shrubs" but not in fall lest permanent injury befall the soil. Peat soils would need potash from manure, perhaps supplied by livestock pasturing on "the hills" on the leeward side of the Lake Michigan dunes.

Phase I reported that Fish Lake Creek drained Fish Lake and its successors west to east and speculated that the south-to-north drain might have been a certain Johnsfield Creek. The inquiry states that part of the drainage "goes north through an underground ditch to the lake." We were able to confirm that this ditch was indeed Johnsfield Creek, deepened later and known today as Kintzele Ditch. Neighboring Brown Ditch and its tributary ditches feed into it. Kintzele and Brown appear in a 1926 aerial photograph of prison farm fields given us by Dr. Noel Pavlovic, US Geological Survey. Johnsfield was apparently a man-made ditch; it doesn't appear on the 1829 surveyor's map he also supplied.

Surprise! When the aerial photo was enlarged, what first looked like cottages and a sandy road through the dune to the north became freight cars and a railroad spur. It turned out that 13 million tons of sand were mined here and on the adjacent Hoosier Slide. Some sold for 20 cents a ton.

Our second drainage challenge, examining the relation of Romel Ditch (mostly in LaPorte County) to EGM, required a site visit to determine direction of flow. So still was the water that we decided it was southwest because all the pondweed (*Potomageton* sp.) leaves pointed that way. David found that Romel, by means of an apparently unnamed ditch connected to it, probably flowed and may still flow towards Kintzele (parts are now buried). It may have been built to let water into or out of the southern holding pond for Blair's cranberry marsh.

Helped by Lakeshore Tract Maps, legal documents, and correspondence, we were able to map the sites of 20 demolished ROU (Reservation Of Use) houses in the EGM environs, dwellings the Lakeshore bought, leased back to the former owners, and later razed. Many of the houses were on "spongy" ground.

Some sellers are still angry: one owner of EGM photos wanted \$200 an hour to talk to me. Needless to say, no interview.

David also mapped separately the prison farm buildings, a former railroad station, and the spa and sanatorium.

We couldn't determine the effects of re-routing US 12 through EGM in 1934 because the only maps INDOT could supply are either vague as to peat removal or illegible. However, thanks again to Noel's 1832-1833 surveyors' map, we were able to place the historic tamarack bog among existing roads.

Surprisingly, the surveyors' map shows two bogs, the one we already knew about, which the surveyors called "pine swamp," and a second farther east they designated "tamarack bog." This second bog is mentioned but not mapped in Gerould Wilhelm's *Special Vegetation of the Indiana Dunes National Lakeshore*. Botanical records indicate that it had the cranberries. Noel, who has lived in Australia, calls it the "Boomerang Bog" due to its shape.

You may ask why something as large as a tamarack bog had to be *found*. Logging, drainage, and years-long peat fires did it in.

What next? Soil sampling, hydrology studies, visits to the surveyors' tamarack bog, planning restoration measures that won't harm neighboring landowners, and a public hearing. The last could be quite dramatic.

Barbara Plampin is a life director of the Shirley Heinze Land Trust and a field botanist who does rare plant monitoring. She lives in the Indiana Dunes.



Amanda Smith

Correction:

A photo that appeared on page 4 of the fall 2014 issue was misidentified. The person holding the monarch butterfly is SWINPAWS president Dona Bergman.

Evansville Partners Tackle Kudzu

Thanks to an unprecedented partnership of public agencies and non-profit organizations, Evansville's largest known kudzu infestation will be eliminated over the next few years. The eradication effort began in early October. In September, the INPAWS council voted to

award \$3,000 to its Southwest Chapter (SWINPAWS) to contribute to the program.

According to Larry Caplan, Vanderburgh County Extension horticulture educator, concerned citizens have known for years that the seven- to 10-acre kudzu patch across the street from Mesker Park Zoo is a serious threat to

horticulture, agriculture and forestry in the area.

"Back in 1995," Caplan said, "I was asked to research ways to control kudzu at this site. I found a wide range of possible solutions, including the suggestion that grazing goats might solve the problem." Over 15 years later, the kudzu patch has grown much larger, and goats are no longer a viable option.

Kudzu, an extremely fast-growing exotic invasive vine, kills or degrades native wildflowers, shrubs, and trees by smothering them under a thick blanket of leaves. (See "Kudzu in Indiana? You Bet!" in the fall 2014 issue of *INPAWS Journal*.) In addition to the obvious ecological damage, kudzu also threatens agriculture. It is an alternate host to soy bean rust, a dangerous pathogen which damages soy bean crops. In southern states where kudzu is prevalent, kudzu bugs are damaging soy beans and becoming a nuisance in homes.

In October, Eco Logic LLC, a regional habitat restoration company based in Bloomington, treated two test plots at the park site with a selective herbicide that affects only plants in the legume and composite families. Kudzu, a mem-

ber of the pea family, is a legume.

"We have treated kudzu in Indiana for the past six years," said Spencer Goehl, Eco Logic's executive director. "This herbicide has proven to be most effective at controlling kudzu while doing very minimal damage to any surviving underlying plants."

The test plot treatments are the opening salvo in a long-term restoration project that could take five to seven years. Kudzu is a particularly persistent pest with extremely large tap roots that can remain viable for years after top growth has been eliminated.

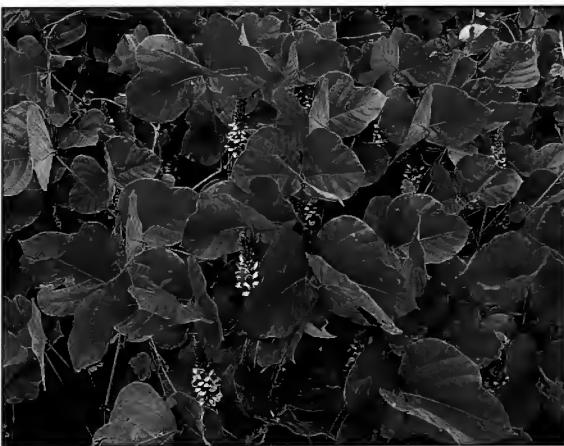
A host of partners have pledged to support and complete the project. Evansville's Department of Sustainability, Energy, and Environmental Quality has been instrumental in organizing the project. Vanderburgh County Purdue Extension, Southwest Indiana Master Gardeners, Mesker Park Zoo and Botanic Garden, Vanderburgh County Soil and Water Conservation District, and SWINPAWS have all pledged to assist in restoration of a diverse natural habitat once the kudzu has been eliminated.

The Southern Indiana Cooperative Weed Management Area is funding much of the initial treatment cost. The Department of Natural Resources is providing technical advice, and US Fish and Wildlife's "Partners in Wildlife" program will provide assistance over the course of the project. The actual cost to the Division of Parks and Recreation for eradicating the kudzu will be minimal.

Parks director Dan Schall stated, "We're grateful to the Southern Indiana Cooperative Weed Management Area and Indiana DNR for tackling this project. Once we are certain the kudzu is eliminated, we can work with the community to decide what will be the best use for the property."

Dona Bergman, SWINPAWS president and director of Evansville's department of sustainability, said, "After the kudzu is eliminated, the plan is to plant the area in annual grasses and native forbs to reduce erosion and start rebuilding the soil. Next we will plant a variety of native oaks to create an oak savanna, adding another attractive spot for songbirds and other wildlife."

purdue.edu



Highly invasive kudzu is a legume related to the soy bean.

Endangered by reservoir proposal

Threatened Flora of Mounds State Park

By Kevin Tungeswick

Well-known for harboring the best-preserved Adena-Hopewell earthworks in Indiana, Mounds State Park is also a floristic jewel. This 290-acre park harbors an amazing 478 vouchered vascular native plant species. Thanks to a pair of floral inventories published in the *Proceedings of the Indiana Academy of Sciences*, it is also one of the most thoroughly inventoried properties in the state.

INPAWS member Dr. Paul Rothrock was lead author of the first inventory published in 1993. As a lifelong Anderson resident, I had frequented Mounds Park since my childhood. I was delighted to meet Paul and receive a copy of his inventory just as my interest in botany was skyrocketing.

Near the time of the first inventory, 30 more acres of city property was added to the park. I began exploring the addition, finding a few species not listed in the inventory, from huge shumard oaks on the floodplain to starry false Solomon's seal (*Maianthemum stellatum*) in the groundwater seepage areas.

Meanwhile stewardship, including prescribed fire in Mounds Fen Nature Preserve, was stimulating the seed bank on the wooded bluff above the fen, where I documented Culver's root (*Veronicastrum virginicum*), New Jersey tea (*Ceanothus americanus*) and poke milkweed (*Asclepias exaltata*) for the first time. I continued to record new species, adding nearly 50 to the original flora.

By 2007, my discussions with Dr. Rothrock and Dr. Donald Ruch of Ball State University led to an update to the 1993 flora. Permits were obtained and fieldwork was completed by me, Dr. Ruch and the late Dr. Byron Torke of BSU from 2008 to 2010. We added 129 species to the original inventory, 97 of them native. This brought the total native species count to 478.

Dr. Ruch performed a Floristic Quality Assessment, yielding a Floristic Quality Index of 96.2 for native species. Anything above 50 is considered of "paramount importance." This is the highest value of any site inventoried in east central Indiana, even higher than Cabin Creek Raised Bog in Randolph County, a National Natural Landmark known for its rare orchids.

State-listed plants that occur in Mounds State Park include tufted hairgrass (*Deschampsia cespitosa*), meadow spikemoss (*Selaginella apoda*), and shining ladies' tresses (*Spiranthes lucida*).

These species occur on the marl flats in Mounds Fen Nature Preserve. The fen and numerous other groundwater seep wetlands contain the majority of the park's highly conservative plant species, those restricted to a very specialized habitat. Other high quality plant communities also occur in the park, particularly on the steep bluffs that tower over White River where the dry oak-hickory community harbors an understory that notably contains thousands of shooting stars (*Dodecatheon meadia*).

We had assumed this botanical paradise was preserved in perpetuity – until March of 2013, when a proposal to dam White River on the east side of Anderson to create a reservoir was revealed to the public after three years of secret planning. The reservoir would inundate approximately one-third of Mounds State Park, including the entirety of the floodplain, all of the deep ravines, and the fen. This project was first touted as an economic development plan and a recreational lake by its primary promoter, the Anderson Corporation for Economic Development. When its ability to be permitted for these purposes was questioned, it was cynically repackaged as a water supply project. In spite of the fact that no major water utility supports it, this argument has gained some traction with those ignorant of the significant untapped ground water resources in the upper White River watershed.

Hoosier Environmental Council and Heart of the River Coalition have proposed an alternative Mounds Greenway plan that would acquire and restore floodplain property from willing sellers along White River between Anderson and Muncie. A multi-use trail would connect the existing river trail systems between Anderson and Muncie.

If you oppose the taking of one-third of Mounds State Park, the unprecedented destruction of a dedicated State Nature Preserve, and the removal of over 900 acres of mature riparian forest, please write Governor Mike Pence and your state and U.S. lawmakers to express your opposition to the reservoir and your support for the alternative greenway proposal.

Kevin Tungeswick is a restoration ecologist with Spence Restoration Nursery in Muncie.



A.L. Gibson

Shining ladies' tresses (Spiranthes lucida) is the only species of ladies' tresses has a yellow lip. It is among the state-listed plants threatened by the proposed dam on the White River near Anderson.

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Submissions

All are invited to submit photos, articles, news, and event postings. Acceptance for publication is at the discretion of the editor. INPAWS welcomes differing points of view.

Please submit text and high resolution photos (300 ppi) via e-mail to journal@inpaws.org.

Submission deadlines for specific issues are:

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Autumn—August 15 for October 1 mailing

Winter—November 15 for January 1 mailing

Membership

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What volunteers can accomplish

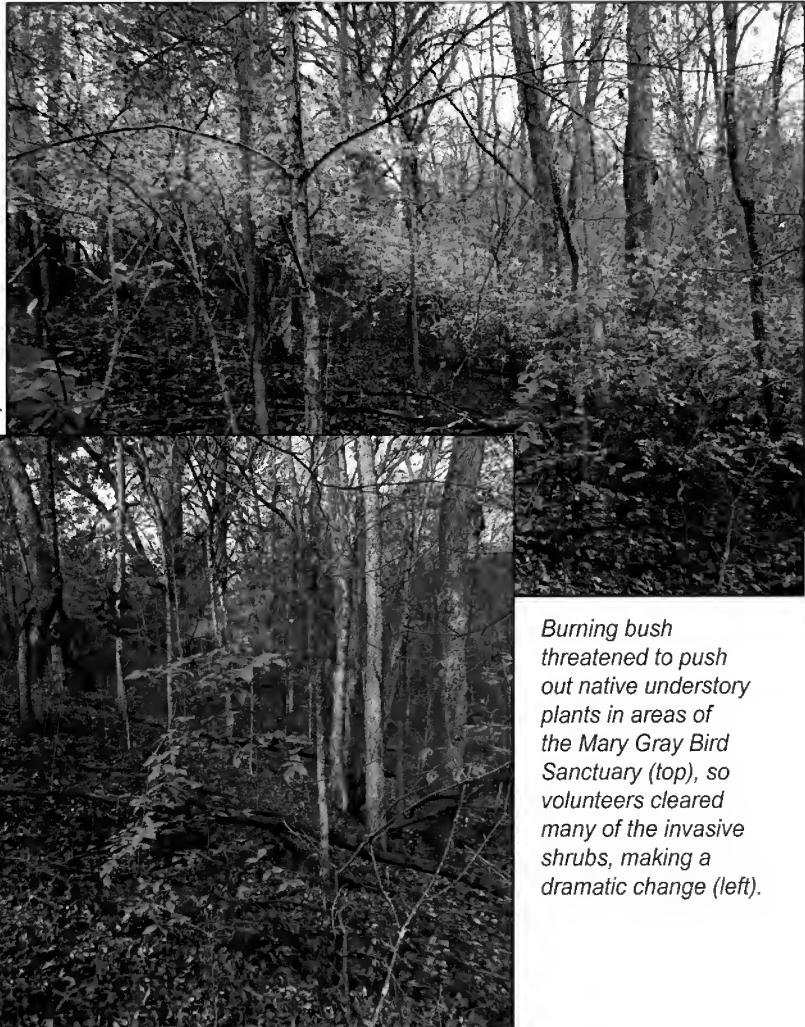
By Tom Hohman

On a pleasant but cool Saturday morning last October, a group of volunteers from INPAWS and Indiana Audubon Society gathered at the Mary Gray Bird Sanctuary to battle a common foe, non-native invasive plants.

The property, located south of Connersville, is owned by the Indiana Audubon Society, which is intent on removing invasives. While the forests and meadows of the property are a natural refuge amidst agricultural lands, it has become obvious that these invasives are a threat to the viability of the property to serve its purpose.

The target that morning was burning bush. Unfortunately, burning bush had been intentionally planted on the property in its early years. Now it was threatening to take over some areas, pushing out all other forest understory plants.

By the time the morning was over, there was an amazing difference in the woods. Because the burning bush was in the midst of its characteristic red fall leaf color, these before and after photos show dramatically what has been accomplished.



Burning bush threatened to push out native understory plants in areas of the Mary Gray Bird Sanctuary (top), so volunteers cleared many of the invasive shrubs, making a dramatic change (left).

“Conservation is to a democratic government by free men as the roots of a tree are to its leaves. We must be willing wisely to nurture and use our resources if we are going to keep visible the inner strengths of democracy.”

— Clinton P. Anderson

Osborne Park gets makeover

By Jeff Ray

The woods of Osborne Park in New Castle are a rare example of a flat woods habitat in a city park that still has a partial herbaceous layer of spring and fall wildflowers and various sedges, plus an assortment of large native trees and no honeysuckle or autumn olive. INPAWS granted \$400 to Robert Cooper Audubon Society (RCAS) in east central Indiana to support creation of interpretive signs as part of a woodland restoration project.

The goal was to restore native grasses and augment the population of wildflowers and trees in order to create better wildlife

habitat and provide area youth and citizens with an experience of the original Tipton Till Plain flat woods. A big advantage of this Henry County site is its accessibility to the public, compared to nature preserves that tend to be isolated and rarely visited.

Work began in late summer 2013 with a glyphosate application to kill the non-native grasses after the native forbs had gone dormant. In early spring 2014, a native grass and forb mix was planted by project manager Jeff Ray, an RCAS conservation committee member, and Jon Creek, chair of that committee and president of INPAWS East Central Chapter.

The seeds were sourced from Spence Restoration Nursery with the assistance of Spence manager Kevin Tungeswick, who has been advisor and seed supplier on all of RCAS's restoration projects. Our goal is to always plant local genotype seed as opposed to seed from other areas of the country.

In late April, Jeff and six volunteers planted 450 trees on the 12-acre site, including red oak, white oak, bur oak, shagbark hickory, shellbark hickory, redbud and hazelnut.

The reliable rains of spring and early summer were ideal for the establishment of the plantings, and the prospect for restoration success is very good.

A tree ID trail with 80 stakes was installed to identify native tree species, some of which have been here for over two hundred years. Natural regeneration of oaks, sycamores, maples and hickories continues to occur.

INPAWS In Action

inpaedc.org



Grass and sedge species planted:

Carex granularis (meadow sedge)
Diarrhena americana (beak grass)
Elymus riparius (riverbank wild rye)
Elymus villosus (silky wild rye)
Elymus virginicus (Virginia wild rye)
Hystris patula (bottlebrush grass)

Forbs included:

Sympyotrichum lateriflorus (side-flowering aster)
Sympyotrichum shortii (Short's aster)
Echinacea purpurea (purple coneflower)
Eutrochium purpureum (sweet Joe-Pye weed)
Ageratina altissima (white snakeroot)
Heliopsis helianthoides (false sunflower)
Mimulus ringens (monkeyflower)
Penstemon calycosus (smooth penstemon)
Rudbeckia triloba (three-lobed black-eyed Susan)
Zizia aurea (golden alexander)

Osborne Park is on the northeast side of New Castle and can easily be found under that name in MapQuest. The restoration area is on the back side of the park, behind the shelters and parking lots. A walking trail circles through the site. Visitors will find it a very pleasant destination with its open pastoral sense along with scattered mature native trees.

Jeff Ray is treasurer of INPAWS East Central Chapter, a member of Robert Cooper Audubon Society, president of Friends of the Blue River, and trails coordinator for Healthy Communities of Henry County. He served as project manager for the Osborne Park restoration.

Limberlost – continued

from page 1

The new east central regional ecologist is Ben Hess. Ben has a vast knowledge of plants, seed propagation, and land management plans.

In 1999, Randy Lehman became site manager of Limberlost State Historic Site. His master's thesis was on water ecology of Patoka River in southern Indiana. Randy was a perfect fit, working with Ken and now Ben.

Limberlost Swamp Remembered became a committee of Friends of the Limberlost in 1996, when the first land was purchased for wetland restoration. The Friends group is unique in that it works with the DNR Division of Nature Preserves and the Indiana State Museum, which owns and manages Limberlost State Historic Site.

Every season has its own charm at Loblolly. In fall, big bluestem grass, goldenrod, sunflowers, prairie dock and asters are in full bloom. Bees and monarch butterflies feed on the plants. Native sparrows include field, chipping, and savannah. In November, short-eared owls return to spend most of the winter at Limberlost Swamp Wetlands. In the mild winter of 2012, over 4,000 waterfowl wintered here, including 72 tundra swans. On the first warm day in February or early March, spring peepers and chorus frogs begin to sing.

"The music of spring begins in the marsh with the frogs," wrote Stratton-Porter. Limberlost has nine of the 11 frog species in northern Indiana, including the northern cricket frog.

The Limberlost is getting recognition as a natural gem of Indiana. Loblolly Marsh Wetland Preserve became Indiana's 250th state-dedicated preserve in 2012. In 2013, Geneva received the first Bird Town designation from the Indiana Audubon Society. The Limberlost bird list is over 200 species in five years.



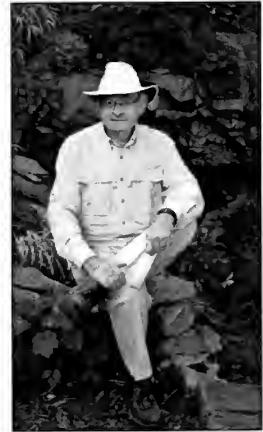
Indiana State Museum

Munchkin Nursery closes

South Central Chapter member Gene Bush has closed Munchkin Nursery that he established in 1995 on his and JoAn's five-acre property near Milltown in Harrison County.

Bush sold his inventory. The nursery is closed while the website, logo, customer list, and goodwill remain on the market.

Gene will continue gardening, writing, doing photography and public speaking about plants. His new "Must Have Messenger" newsletter "will combine 30 years of shade gardening with 20 years of nursery experience." His "My Shade Solutions" blog will continue. *



Gene Bush is seated near a cave on his property in Harrison County.

Loblolly Marsh Wetlands Preserve became a state-dedicated preserve in 2012.

Those who want a personal tour of the Limberlost wetlands can "Rent-a-Naturalist" for a small fee and hire Limberlost naturalist and program developer Curt Burnette. Everyone from Red Hat Ladies to book clubs and families has "rented" Curt. For information, contact him at cburnette@indianamuseum.org or call 260-368-7428.

Terri Gorney is vice-president of Friends of the Limberlost and serves on the boards of Indiana Audubon Society and the Society of Indiana Pioneers. She volunteers for DNR at Limberlost State Historic Site in Geneva.

Roots – continued

from page 3

things need nitrogen, and they can't obtain it directly from the air. It has to be turned into ammonia or nitrates to be usable by plants. Here's how it works: On a few plants, extremely fine root hairs grow out of the roots at right angles. They attract and admit bacteria that stimulate the root to create a nodule as a home for them. The bacteria then convert nitrogen from the air into ammonia in the soil. This multitude of rootlets greatly expands the surface area of these plants' roots. Thus the plant has much more nitrogen available in a usable form.

These plants are the first settlers, pioneers if you will, in soil that hasn't hosted plants previously. Each plant requires a specific kind of bacterium. Only when a plant and bacterium type that are destined for each other meet do the bacteria enter the root. The bacteria also benefit, because the plant supplies energy to help it convert the nitrogen. A single plant can have hundreds of root nodules, all containing sugars and other carbohydrates as well as millions of rhizobial bacteria. The larvae of picture-winged flies have discovered these yummy restaurants. Newly hatched maggots survive by eating only the nodules.

Apart from the nodules, bacteria and roots help each other out in another way. Bacteria consume organic substances released by roots. In turn, the bacteria transform minerals and organic and inorganic matter into nutrients the plants can use. ("You scratch my back; I'll scratch yours.")

Near Lake Michigan, wind and waves have cut away sand to reveal the long roots of grasses in a dune.



Human use of roots

Roots probably always have served humans as medicine and food. A familiar example of a medicinal plant is the coneflower (*Echinacea purpurea*, *E. pallida* and *E. angustifolia*). Native Americans used the chewed roots of *E. purpurea* to treat chronic inflammations and infections. A market still exists for the roots of *E. pallida* and *E. angustifolia*, which are used to make herbal medicines and tonics. In some areas, illegal digging even poses a major threat to the plants.

As for food, spring beauty corms can be used as a vegetable similar to potatoes or chestnuts, and false Solomon's seal roots as a vegetable cooked like a potato. Jerusalem artichoke (*Helianthus tuberosus*) occasionally is grown as a crop; the edible part is the tubers borne on rhizomes emanating from the fibrous roots.

Many plant names contain the word "root." The stem of blood-root (*Sanguinaria canadensis*), when broken, yields a blood-red juice with which Native Americans used to paint themselves. Be careful if you pick it, however, because the stain is lasting. The root of Culver's root (*Veronicastrum virginicum*) purportedly was used by a doctor named Culver in his practice.

Roots are the infrastructure of plants, busily doing their support work, unseen by us as we admire beautiful blooms above ground and marvel at the web of life. Let's appreciate roots more—let's root for roots!

Amy Perry is a retired editor, recording secretary of INPAWS, and a member of the Central Chapter.

Conference draws record crowd

By Tom Hohman

It takes a team to run a conference, particularly one with not only speakers, but a book sale and a large exhibition area, too. This year's Nov. 1 conference at Bloomington drew a record crowd of 260.

Undeterred by snow flurries the night before, they gathered to listen to a great lineup of speakers, stroll through an exhibitor area with 18 displays from sponsors and non-profit organizations, and choose from a great selection of nature-themed books. Other features included a silent auction for rare books and trays of native plants, and even free milkweed seeds, compliments of one of the attendees.

Mark Nov. 14, 2015 on your calendar for next year's conference. Keynote speakers will be Doug Tallamy and Rick Darke. Professor Tallamy, who has spoken in Indy several times previously as a guest of INPAWS, has partnered with Rick Darke for a new book, *The Living Landscape: Designing for Beauty and Biodiversity in the Home Garden*. More details on the conference will be available as we get closer to the date.

Doug Tallamy will address INPAWS' 2015 Conference.

Members of the conference team were:

Tom Hohman – conference team leader

Jeff and Sandy Belth – speaker liaison

Mary Damm – conference menu, including local foods

Lynn Dennis – registration

Wendy Ford – conference web site and materials

Marilynn Frohberg – conference finances

Mike Homoya – program

Ellen Jacquart – sponsors & exhibitors

Cathy Meyer – high school outreach

Fritz Nerding – audio-visual

Suzanne Stevens – book sale & silent auction

Conference day volunteers included

Nancy Ayers, Lee Casebere, Steve Dunbar,



Michael Huff



Michael Huff

During INPAWS 2014 annual conference, speaker Lincoln Brower signed a copy of his book for Mary Damm (above). Attendees visited exhibits (left) and chatted in the meeting room.



Michael Huff

Pat Furner, Gillian Harris, Kathy Hohman, Michael Huff, Karen LaMere, David Mow, Donna Ormiston, Amy Perry, Joe Phillips, Vicky St. Myers, and Mary Wood.



Benign – continued from page 16

because we would lose the emerging wildflowers. So he waits.

"Now can I mow?" he'll say.

"Not yet. I'm waiting for the rose pinks."

He waits all summer. I hold him off as long as possible in the fall, and then it sometimes happens that the weather becomes too wet or too cold or just too nasty. As a result, our front field wasn't mowed for two years.

There is good news and bad news.



Patricia Cornwell

*Wild pink roses
(above) and
wingstem (right),
reappeared at the
Cornwell property
thanks to benign
neglect.*

After two years of benign neglect, this summer the field was full of lovely, arching wild roses, thousands of rose pinks (*Sabatia angularis*), 28 slender ladies-tresses, half a dozen small shrubs of hoary mountain-mint, and one six-foot-tall wingstem. I was in my glory.

The bad news? The resurgence of the "bad guys": field thistles (*Cirsium discolor*), wild blackberry (*Rubus* genus), *Rosa multiflora*, Japanese honeysuckle (*Lonicera japonica*), Eastern red cedar (*Juniperus virginiana*), and smooth sumac (*Rhus glabra*). Sure, these are all natives except the honeysuckle and multiflora, but they are nevertheless aggressive. And yes, insects and birds happily feed on their blossoms and berries, but they only propagate them further.

The Capone of this band of gangster plants is invasive autumn olive (*Elaeagnus umbellata*).

New! Writers' guidelines

are now on the INPAWS web site at www.inpaws.org/about-us/inpaws-journal. These helpful tips make it easy to share your native plant discoveries with others.

One bush went unnoticed in the corner of our property for years and last summer another raised its head in the top of the field. Finally I determined these were not native silverberry (*E. commutata*), so I proceeded to cut their woody branches and spray them with glyphosate. (See "Is that your final answer?" in the fall 2014 issue of *INPAWS Journal*.)



Patricia Cornwell

The other invasive that I battle every summer is field thistle. These prickly opponents with their deceptively lovely violet blooms disperse thousands of seeds on the wind. Every year I fight back, spending many sweaty hours dead-heading and bagging their blooms, spraying the stems with glyphosate. Last summer was mild, so I managed to cut every thistle bloom on the entire 19 acres! Perhaps it's only a temporary triumph, but it feels good.

In October my patient husband mowed, leaving only one blackberry patch for the birds, the wild roses I had tagged with pink construction tape, and the wingstem. We will never be totally rid of thistle, honeysuckle or multiflora rose. But, ever the optimist, I prefer to see a field half-beautiful rather than a field half-ugly.

Patricia Happel Cornwell is a Master Naturalist and editor of the INPAWS Journal.

Indiana Conservation Alliance Moves Forward

By Jane and David Savage

"A unified voice advocating for public funding for land, water, and wildlife conservation" is the mission of the Indiana Conservation Alliance (INCA). INPAWS shares a common interest in protecting our natural resources with 25 other member non-profit organizations.

March 24 is Conservation Day at the Statehouse. Sponsored by INCA, it is an opportunity to meet with your representatives and make your voice heard for the protection of our natural resources and to thank them for their service.

During the 2015 session of the Indiana General Assembly from early January to late April, Indiana's budget for the next two years will be adopted. If you believe that public funding for Clean Water Indiana (CWI) and Indiana Heritage Trust (IHT) is important, contact your representatives and tell them so. To find your legislators go to: <https://iga.in.gov>.

INCA was formed a decade ago around the legislative priorities of public funding for the Clean Water Indiana and Indiana Heritage Trust programs. CWI was created to protect and enhance the water quality in Indiana's lakes, rivers and streams. IHT was created to purchase and protect natural lands for state and local parks, forests, fish and wildlife areas, nature preserves, state recreation areas and historic sites.

The INCA legislative priorities for 2015 will continue to be CWI and IHT, with continued support for the Bicentennial Nature Trust. Other priorities were determined at the annual all-member meeting at the end of November.

Mar. 24 is Conservation Day at the Statehouse.

Lynn Dennis, INPAWS member, is retiring chair of the INCA steering committee. New steering committee co-chairs are Holly Jones, Indiana Urban Forest Council executive director, and Jim Sweeney, president of the Porter County Chapter and member of the state executive board of the Izaac Walton League of America.

Other steering committee members are: Tim Maloney, Hoosier Environmental Council; Chris Torp, Hoosier Chapter of the Soil and Water

Letha's Fund makes grants

INPAWS' Letha's Youth Outdoor Fund committee awarded 14 grants in 2014, totaling \$5,735. Recipients included elementary and high schools, a Boys and Girls Club, and environmental education centers. Some field trips will take place in 2015. The programs funded involve 905 young participants. 

Plant sale set for May 9

INPAWS' annual native plant sale and auction will be Saturday, May 9, at Park Tudor High School, Indianapolis.

Deb Bonte, who was in charge of last year's sale, returns as chair this year. She invites members to participate: "We will be eager to have you as a volunteer or to receive your donated plants. Contact me at plantsale@inpaws.org."

Watch for details in the next journal issue and on the web site blog and Facebook pages.

Conservation Society; John Ulmer, Hoosier Heartland; Paula Baldwin and Jennifer Boyle-Warner, Indiana Association of Soil and Water Conservation Districts; Glenn Lange, Indiana Chapter of The Wildlife Society; Barb Simpson, Indiana Wildlife Federation; and Lynn Dennis, The Nature Conservancy.

Over the past six months, regional meetings in the south, southeast and north were held for the first time to widen the circle of individuals concerned about conservation issues and willing to contact their legislators to advocate for INCA priorities.

To receive INCA updates, sign up at www.inconservation.org.

Jane and David Savage are co-chairs of INPAWS' conservation committee and board members of the Brown County Native Woodlands Project. Jane is also a Master Gardener. David is on the steering committee of Southern Indiana Cooperative Invasives Management.



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BOTANICAL GARDEN

Benefits of benign neglect

A field half-beautiful

By Patricia Happel Cornwell

What is it about a “new” wildflower that makes our heart skip a beat? Makes us run for the camera? Tell a friend? Grab a book and look it up? And what is it about that discovery that saddens us when, the next year, the new flower fails to return?

In the 17 years since my husband and I bought 17 scruffy acres (and later two more) in Harrison County, I have delighted in the hundreds of wildflowers that come and go here. Each one is received as a gift. And each one that fails to appear the next year is felt as a loss.

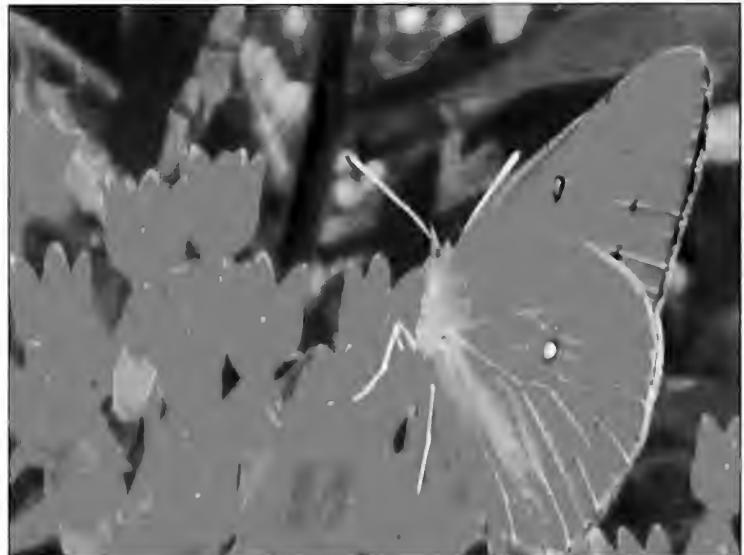
In 1998 and 1999, I found one or two small plants of slender gerardia (*Agalinis tenuifolia*, also called slender false foxglove) in the shady side yard. I haven't seen one since because they were in the path of the mower. I keep a picture of my first violet-pink slender gerardia in one of my wildflower books, the way you might keep a picture of your grandmother in a prayer book (or a cookbook).

In those early years, a brief appearance was also made by a couple of tall, yellow-flowered evening primroses (*Oenothera biennis*) in the edge of the driveway. After being mowed, they never returned.

Slender ladies-tresses (*Spiranthes lacera*) have waxed and waned in our field. In August, 2003, there were only three specimens of this tiny white, spiraling orchid.

A wingstem (*Verbesina alternifolia*, also called yellow ironweed) popped up in the fence line one year, but got whacked when that was cleaned out. A thicket of wild pink roses in the edge of our woods was wiped out in 2004 when we had a barn built. In their place came hoary mountain-mint (*Pycnanthemum pycnanthemosides*). As zealous blades edged farther into the trees with each mowing, the mountain-mint eventually disappeared.

I realize that if we never mow, our home will soon look like Sleeping Beauty's castle, overrun with brambles and impenetrable with vines. However, sometimes it is inconvenient to mow. If my husband procrastinates in early spring, I tell him he can't mow in summer



Patricia Cornwell

Benign – continued on page 14